Engineering a Sustainable Future

June 22, 2012
Nobis Project No. 81015

Via Electronic Submittal

Massachusetts Department of Environmental Protection
Attention: Janet Waldron, Project Manager
One Winter Street
Boston, MA 02108

Subject: MADEP Release Tracking Number 3-0322
Groveland Wells Superfund Site
Long-Term Groundwater Monitoring
2011 Data Evaluation Report

Dear Ms. Waldron:

Attached with this correspondence is the draft 2011 Data Evaluation Report for the Groveland Wells Superfund Site Long-Term Groundwater Monitoring. This report presents the evaluation of data collected during the Spring and Fall 2011 groundwater monitoring events performed for the Groveland Wells Site on behalf of the United States Environmental Protection Agency (spring event) and the Massachusetts Department of Environmental Protection (fall event).

Should you have any questions or comments, please contact me at (978) 703-6025 or dbaxter@nobiseng.com.

Sincerely,

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2011 Data Evaluation Report

Groveland Wells Superfund Site
Long-Term Groundwater Monitoring

MADEP Release Tracking Number: 3-0322

SARSS V Contract

Task Assignment #101547

FOR

Massachusetts Department of Environmental Protection

SARSS V

BY

Nobis Engineering, Inc.

Nobis Project No. 81015

June 2012

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BY

Nobis Engineering, Inc.

Nobis Project No. 81015
June 2012

Lauren D. Soos
Project Engineer

Diane M. Baxter
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TABLE OF CONTENTS
2011 DATA EVALUATION REPORT
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

SECTION **PAGE**

1.0 INTRODUCTION 1

2.0 SITE BACKGROUND 1

3.0 SUMMARY OF FIELD ACTIVITIES 4
3.1 Water Level Monitoring 4
3.2 Groundwater Temperature Monitoring 4
3.3 Groundwater Monitoring Well Sampling 5
3.3.1 Monitoring Locations 5
3.3.2 Analytical Methods 6
3.4 Groundwater Extraction Well Sampling 6

4.0 GROUNDWATER EXTRACTION AND HYDROGEOLOGY 7
4.1 Groundwater Extraction Wells 7
4.2 Groundwater Elevation and Horizontal Gradients 7
4.3 Vertical Hydraulic Gradients and Groundwater/Surface Water Relationships . 9

5.0 SAMPLING RESULTS 9
5.1 Source Area Temperature 9
5.2 Groundwater Monitoring Well Sampling Results 10
5.3 Groundwater Extraction Well Sampling Results 11
5.4 Summary of Findings 12
5.4.1 TCE and Cis-1,2-DCE Data Trends 12
5.4.2 Groundwater Plume Delineation 13
5.4.3 Comparison with Historic Plume Extents 14

6.0 CONCLUSIONS AND RECOMMENDATIONS 14

7.0 REFERENCES 15

TABLE OF CONTENTS (cont.)
2011 DATA EVALUATION REPORT
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

TABLES

1 Summary of Sample Analyses and Quantities
2 Analytical Results and Maximum Contaminant Levels for Volatile Organic Compounds Detected in Groundwater – Spring 2011
3 Analytical Results and Maximum Contaminant Levels for Volatile Organic Compounds Detected in Groundwater – Fall 2011
4 Trichloroethene Concentrations Detected in Groundwater – Spring 2005 through Fall 2011
5 Cis-1,2-Dichloroethene Concentrations Detected in Groundwater – Spring 2005 through Fall 2011

FIGURES

1 Site Locus Plan
2 Valley Manufacturing Property Site Plan
3 Groundwater Monitoring Locations
4 Groundwater Extraction Locations
5 Estimated Groundwater Contours – Spring 2011
6 TCE Concentrations in ERT-9, TW-12, and TW-24
7 Overburden TCE Plume – Fall 2011
8 Cross-Section A-A' and TCE Plume – Fall 2011
9 Overburden TCE Plume 2000, 2006, and 2011

APPENDIX

A Confirmation Groundwater Sampling Results – Trichloroethene
B Source Area Temperature Evaluation
C Summary of Groundwater Analytical Laboratory Results
D Summary of Extraction Well Analytical Results
E Groundwater and Surface Water Elevation Data

Acronyms List

˚C	Degrees Celsius
CAM	Compendium of Analytical Methods
cis-1,2-DCE	cis-1,2-Dichloroethene
CLP	Contract Laboratory Program
COCs	Constituents of Concern
Con-Test	Con-Test Analytical Laboratory, Inc.
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
˚F	Degrees Fahrenheit
FSP/QAPP	Field Sampling Plan and Quality Assurance Project Plan
Ft MSL	Feet above Mean Sea Level
Gpm	Gallons per minute
GWTF	Groundwater Treatment Facility
ISTT	In Situ Thermal Treatment
LTRA	Long-Term Response Action
MassDEP	Massachusetts Department of Environmental Protection
MCL	Maximum Contaminant Level
MOM	Management of Migration
Nobis	Nobis Engineering, Inc.
O&M	Operations & Maintenance
OU	Operable Unit
PDB	Passive Diffusion Bag
RAS	Routine Analytical Services
ROD	Record of Decision
SC	Source Control
SVE	Soil Vapor Extraction
TCE	Trichloroethene
µg/L	Micrograms per liter

USTs	Underground Storage Tanks
Valley Manufacturing	Valley Manufactured Products Company
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

Nobis Engineering, Inc. (Nobis) has prepared this 2011 Groundwater Data Evaluation Report for the Massachusetts Department of Environmental Protection (MassDEP) under the Site Assessment and Remediation Support Services Contract, Task Assignment #101547. This report documents the long-term groundwater monitoring activities performed in the Spring and Fall 2011 for the Groveland Wells No. 1 and 2 Superfund Site (the Site) in Groveland, Massachusetts. Groundwater monitoring activities were completed by Nobis under the following contracts:

- Spring 2011 – Remedial Action Contract (RAC) EP-S1-06-03, Task Order No. 0012-RA-LR-0132 for United States Environmental Protection Agency (EPA) ; and
- Fall 2011 – Site Assessment and Remediation Support Services Contract, Task Assignment #101547 for MassDEP.

The report summarizes analytical results and data trends; provides interpretations of groundwater hydrogeology and contaminant plume delineation; and provides a summary of findings and conclusions.

2.0 SITE BACKGROUND

The Site includes an 850-acre study area (Operable Unit 1), mostly located in the southwestern part of the Town of Groveland (Figure 1). The Site is bounded to the north by the Merrimack River and includes private residences, industries, small businesses, and religious and community institutions. Groundwater at the Site is contaminated with volatile organic compounds (VOCs), primarily trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE). The identified source of the groundwater contamination is the Valley Manufacturing Products Company (Valley Manufacturing) property (Operable Unit 2).

The Valley Manufacturing property was used for metal and plastic parts manufacturing from 1963 until 2001. Historical processes at the Site included machining, degreasing, and finishing of metal parts. Chlorinated solvents (primarily TCE) and cutting oils were released from the Valley Manufacturing property on numerous occasions throughout the 1960s and 1970s, including surface releases, leakage from underground storage tanks (USTs), and discharges to leach fields (Figure 2). A total of 3,000 gallons of contaminants is estimated to have been

discharged to the environment [RFW, 1988]. Most of the releases appear to have occurred south of the Valley Manufacturing building, beneath the Former Porch Area (Figure 2). These releases migrated through the vadose zone to groundwater beneath the Valley Manufacturing property and eventually contaminated the aquifer that supplied the Town of Groveland's drinking water.

In June and October 1979, Groveland's drinking water supply wells Stations No. 1 and 2, were determined to be impacted with TCE (Figure 1). The Site was placed on the National Priorities List in December 1982. In 1988, EPA issued a Source Control (SC) Record of Decision (ROD) for Operable Unit 2 (OU2) [EPA, 1988] requiring cleanup of the VOC contamination in the source area on the Valley Manufacturing property. The major components of the selected remedy for the SC Operable Unit included installation, operation, and maintenance of a Soil Vapor Extraction (SVE) system to clean all areas of subsurface soil VOC contamination and a groundwater recovery/re-circulation and treatment system.

In September 1991, EPA issued the Management of Migration (MOM) ROD for Operable Unit 1 (OU1) [EPA, 1991]. The MOM ROD required extraction and treatment of contaminated water from outside the source area and the downgradient plume. The MOM remedial actions were intended to supplement remedial actions required by the SC ROD.

In November 1996, EPA issued Explanation of Significant Differences (ESD) to both the SC (OU2) and MOM (OU1) RODs. The ESD removed the requirement for a separate groundwater extraction and treatment system for the SC Operable Unit and mandated that the groundwater from the source area would be extracted and treated in the OU1 groundwater treatment facility (GWTF) to be constructed downgradient of the source area [EPA, 1996a and 1996b]. However, due to financial issues, Valley Manufacturing was not able to fulfill this obligation. Therefore, EPA made this Site a fund-lead with access to federal funding. The OU1 GWTF was constructed beginning in 1999, and began operating in 2000 by treating groundwater extracted from wells located immediately downgradient of the source area and wells farther downgradient, north and south of Mill Pond.

The OU1 GWTF was determined to be operational and functional in a May 31, 2001 letter sent by the MassDEP to EPA, marking the official start of the operation of the Long-Term Response Action (LTRA). EPA was responsible for operation, maintenance, and monitoring of the LTRA

through May 31, 2011, ten-years after the GWTF became operational and functional. Following this ten-year period, the responsibility for the LTRA transferred to the MassDEP. The OU1 GWTF remains in operation today (2012), under the direction of the MassDEP and its operation and maintenance (O&M) contractor.

Pursuant to the SC (OU2) ROD, Valley Manufacturing constructed and operated a SVE system from 1992 through 2002. In April of 2002, Valley Manufacturing ceased operating and maintaining the SVE system due to financial difficulties and terminated all business operations.

In 2004 and 2006, EPA performed source area investigations, UST removals, and chemical-oxidation treatment pilot studies that were documented in the Source Area Re-evaluation Report [M&E, 2006]. These investigations concluded that the initial SVE remedial action had been largely ineffective, a significant source area contamination remained, and a chemical oxidation remedy would not be a viable remedial alternative. In September 2007, based on the results of the Source Area Re-evaluation EPA issued a second ESD for OU2 that modified the SC remedy to include SVE enhanced by In Situ Thermal Treatment (ISTT) to improve removal of VOCs from source area soils and overburden groundwater.

Between April 2009 and August 2010, EPA constructed the ISTT system. The ISTT system operated from August 2010 to February 2011. Following completion of ISTT remediation activities, confirmation soil and groundwater samples were collected at select locations within the source area. The results of the confirmation soil sampling conducted in 2011 indicated that TCE concentrations exceeding the cleanup goal were detected in only two of the 44 confirmation soil samples. The remaining elevated concentrations of TCE, 5,600 microgram per kilogram (µg/kg) and 7,000 µg/kg, were localized in two relatively small areas in the shallow vadose zone below a paved portion of the Site. Based on groundwater sampling results, the remaining TCE in isolated areas of the vadose zone does not appear to affect groundwater. Infiltration of significant surface water is not anticipated in this area. Therefore, significant migration of TCE to groundwater from the remaining areas of elevated TCE concentrations in vadose zone soil is not expected [Nobis, 2011a].

Confirmation groundwater sampling was performed on three occasions at approximately six weeks, twelve weeks, and six months after the completion of ISTT remediation activities. The results of the confirmation groundwater sampling conducted in 2011 indicate that a significant

reduction of TCE has occurred in the source area (Appendix A). TCE concentrations in groundwater were reduced achieving greater than 95 percent removal at most locations. The maximum TCE concentration detected in the source area was reduced from 11,000 micrograms per liter (µg/L) to 78 µg/L. Concentrations of TCE generally remained relatively constant or continued to decrease during the 6-month period of confirmation groundwater monitoring. No significant increases, or rebound, of TCE were observed. Although ISTT significantly reduced the concentrations of TCE in Site groundwater, TCE concentrations remained above the Site cleanup goal for TCE (of 5 µg/L) in eight of the 16 locations [Nobis, 2011a].

Long-term monitoring of Site groundwater has and will continue to provide valuable information on the overall effectiveness of the GWTF operations (OU1) and the ISTT remedy (OU2).

3.0 SUMMARY OF FIELD ACTIVITIES

This section describes the long-term groundwater monitoring field activities conducted in 2011. Groundwater monitoring field activities were performed by Nobis. In addition, relevant data collected by the MassDEP GWTP O&M contractor has also been included.

3.1 Water Level Monitoring

Groundwater and surface water levels were measured on April 8, 2011 by Nobis. Groundwater levels were also collected by Nobis on November 17, 2011 from select groundwater monitoring wells during groundwater monitoring activities. No surface water levels were collected in November 2011.

3.2 Groundwater Temperature Monitoring

Groundwater temperature measurements were collected on November 17, 2011 and December 12, 2011 by Nobis from select groundwater monitoring wells within the source area to evaluate the temperature of groundwater following ISTT operations. Groundwater was collected using a disposable bailer. The water was immediately poured into a measuring cup and the temperature was measured using a thermometer and recorded in the site log book.

3.3 Groundwater Monitoring Well Sampling

Groundwater monitoring well sampling was performed by Nobis on April 5 and 6, 2011 and December 9, 2011 primarily using Passive Diffusion Bag (PDB) technology. The “Spring” and “Fall” monitoring events were conducted in accordance with the Quality Assurance Project Plan (QAPP), Revision 3 [Nobis, 2009] and the Field Sampling Plan / QAPP (FSP/QAPP) [Nobis, 2012], respectively. The PDBs were placed in the selected monitoring wells at intervals that were pre-determined based on the results of previous groundwater monitoring events. At wells where additional sample volume was required for quality assurance/quality control (QA/QC) samples, multiple PDBs were installed.

The PDBs were installed at the desired depth within the well screen area in each monitoring well and allowed to equilibrate with the aquifer for approximately 21 days. Upon PDB retrieval, the water within the PDBs was transferred into sample containers and appropriately preserved.

During the Spring 2011 event, three newly installed groundwater monitoring wells, TW-49S, TW-49D, and TW-49R, were sampled using low-stress/low-flow methods.

3.3.1 Monitoring Locations

A summary of monitoring wells and laboratory analyses used to analyze samples collected during the Spring and Fall 2011 sampling events is provided in Table 1. Monitoring well locations are shown on Figure 3. During the Spring and Fall 2011 monitoring events, samples were collected from 19 and 23 monitoring wells, respectively.

During the Spring and Fall 2011 sampling events, multiple PDBs were installed in two groundwater monitoring wells, TW-24 and ERT-9, to collect additional volumes for QA/QC samples. In addition, four PDBs were installed and sampled in each of the new groundwater monitoring wells, TW-49S, TW-49D, and TW-49R, during the Fall 2011 event. Multiple PDBs were installed across the well screen to evaluate the vertical profile of contamination within the wells and determine the appropriate sampling depth for future events.

Because the groundwater in the source area remained at elevated temperatures following ISTT, limited sampling of source area groundwater monitoring wells was conducted in 2011. During the Spring 2011 event, no source area monitoring wells were sampled. Only one source area

groundwater monitoring well, TW-31, was sampled in the Fall 2011. Sampling of source area groundwater monitoring wells will resume when groundwater temperatures return to the baseline temperature (Section 4.1).

3.3.2 Analytical Methods

Groundwater samples collected from the PDBs during the Spring and Fall 2011 monitoring events were submitted for VOC analysis in accordance with the QAPP [Nobis, 2009] and FSP/QAPP [Nobis, 2012], respectively (Table 1). The Spring 2011 samples were submitted to a preselected laboratory through the EPA Contract Laboratory Program (CLP) for Routine Analytical Service (RAS) and analyzed for either trace concentration VOCs or low/medium concentration VOCs using EPA method SOM01.2. The Fall 2011 samples were submitted to Con-Test Analytical Laboratory (Con-Test) and analyzed for VOCs using EPA SW-846 Method 8260B.

3.4 Groundwater Extraction Well Sampling

Groundwater extraction wells were sampled as part of routine GWTF O&M on January 4, April 5, June 29, and October 21, 2011 by Nobis under EPA's RAC contract (in January and April) and by MassDEP's GWTF O&M contractor (in June and October). Groundwater extraction wells are sampled quarterly as part of the GWTF O&M activities. Groundwater extraction wells are located in the following areas (Figure 4):

- Source Area – EW-S1, EW-S2, EW-S3;
- South of Mill Pond – EW-S4, EW-S5 (formerly called ERT-5); and
- North of Mill Pond – EW-M1, EW-M2, EW-M3 (formerly called NUS-5), G1, and G2.

All groundwater extraction wells were sampled during the quarterly sampling events with the exception of source area extraction wells, EW-S1, EW-S2, and EW-S3. Due to ISTT operations (in January 2011) and elevated temperatures within the source area (in April 2011), source area extraction wells were not sampled during the January and April 2011 extraction well sampling events. Sampling of these locations resumed during the June 2011 extraction well sampling event.

The January and April 2011 extraction well samples were submitted to a pre-selected laboratory through the EPA CLP RAS program and analyzed for either trace concentration VOCs or low/medium concentration VOCs using EPA method SOM01.2. The June and October 2011 samples were submitted to a MassDEP-accepted laboratory (Con-Test) and analyzed for VOCs in accordance with the MassDEP's GWTF O&M contractor's QAPP.

4.0 GROUNDWATER EXTRACTION AND HYDROGEOLOGY

The groundwater extraction system has an impact on groundwater elevations in several areas of the Site. To present an evaluation of groundwater flow at the Site, this section of the report includes a brief description of the extraction system; an analysis of groundwater flow directions; and discussions of vertical hydraulic gradients and the interactions between groundwater and surface water at the Site.

4.1 Groundwater Extraction Wells

The groundwater extraction system consists of ten extraction wells located in the source and downgradient areas (Figure 4). Three extraction wells (EW-S4, EW-M1, and EW-M3) were operational in 2011. Source area extraction wells, EW- S1, EW-S2, EW-S3, have been off line since ISTT operations began in 2010. Operation of these wells may resume when ambient groundwater temperatures are below 37.9 °C (100 degrees Fahrenheit [°F]). Extraction wells EW-M2, G1, G2, and EW-S5 have been off line for an extended period due to low contaminant levels and/or excessive maintenance requirements.

The current operation and typical extraction rates of the extraction wells are described in the O&M reports provided by the MassDEP's GWTF O&M contractor.

4.2 Groundwater Elevation and Horizontal Gradients

Estimated groundwater elevation contours and flow direction for overburden groundwater during the Spring 2011 sampling event are included on Figure 5; however, due to the limited water level measurements collected in the Fall 2011, contours and flow direction were not estimated for the Fall 2011 monitoring event. Water level measurements were not collected at the Source Area due to elevated temperatures related to the ISTT remedial action. Groundwater elevation contours and flow direction are not presented for the bedrock aquifer for either period because

of the limited number of bedrock wells with measurements. Groundwater elevation measurements are provided in Appendix B.

In the area south of Mill Pond, the direction of groundwater flow, based on a limited number of water levels, is to the north or northeast (Figure 5). Although groundwater is extracted only from a bedrock groundwater extraction well (EW-S4; groundwater was not extracted from EW-S5 in 2011) in that area, historic data gathered during initial GWTF operations suggested that the withdrawal from the bedrock also causes drawdown in the overburden. The typical extraction rate from EW-S4, approximately 40 gallons per minute (gpm), is greater than it was during system startup, 6 gpm [Nobis, 2011b]. Therefore, it is likely that some downward movement of groundwater from the overburden into the bedrock is occurring in this area.

Historically, the surface water of Mill Pond has been observed to influence shallow groundwater elevations in the area. The water level in the pond in April 2011 was approximately 6 feet lower than in April 2010 [Nobis, 2011b]. Groundwater levels in the overburden near both ends (north and south) of Mill Pond in April 2011 were generally one to two feet lower than in April 2010. The water level in the pond was not measured November 2011.

The estimated groundwater contours of the overburden in the area north of Mill Pond show groundwater flowing toward the north and northwest. The groundwater flow appears to be influenced by Johnson Creek, which turns toward the northwest approximately 150 feet north of Mill Pond. The horizontal hydraulic gradient in the area north of Mill Pond was calculated to be approximately 0.028 ft/ft, using groundwater elevations at DEQE-10 and ERT-13 (collected in April 2011).

Based on the groundwater elevations in bedrock monitoring wells located between the source area and Mill Pond, groundwater flow is generally northeast toward Mill Pond. The water elevation was also measured in bedrock extraction well EW-S4; however, groundwater elevations in pumping wells are generally not useful for contouring the potentiometric surface because of the steep gradients that typically exist immediately around the wells. The water elevation in EW-S4 of about 3.13 feet above Mean Sea Level (ft MSL) in April 2011 (Figure 5), strongly suggests that a fairly steep cone of depression exists at this bedrock extraction well when compared to bedrock monitoring well TW-12, located approximately 200 feet upgradient.

4.3 Vertical Hydraulic Gradients and Groundwater/Surface Water Relationships

In November 2011, groundwater measurements collected at well triplicate, TW-49S, TW-49D, and TW-49R, showed a downward vertical hydraulic gradient (Appendix E). The nearest extraction well is located over 600 feet away from this monitoring well location; therefore, the gradient observed at this location likely reflects natural (non-pumping) conditions.

In the area south of Mill Pond, there are no adjacent overburden and bedrock monitoring wells. However, the low water level at bedrock extraction well, EW-S4, in April 2011 (3.13 ft MSL) suggests that the vertical gradients are downward in response to the withdrawal of water from the bedrock.

In April 2011, the surface water elevation in the pond was slightly lower than the near-by overburden groundwater monitoring wells (Figure 5). Under these conditions, shallow overburden groundwater is likely discharging to Mill Pond. This relationship is highly dependent on precipitation events and is variable throughout the years.

5.0 SAMPLING RESULTS

This section discusses the following field and analytical sampling results:

- Field temperature results of select groundwater monitoring wells within the source area;
- VOC analytical results for groundwater samples collected from site groundwater monitoring wells; and
- VOC analytical results for groundwater samples collected from the groundwater extraction wells.

5.1 Source Area Temperature

During ISTT activities source area groundwater temperatures reached 100°C. Temperatures ranged from 30 degrees Celsius (°C) to 47°C (Appendix C) during the 2011 temperature monitoring events. Initial cooling rates were anticipated to occur at approximately 1°C per day based on similar sites. However, based on temperatures observed during 2011, the actual cooling rate is approximately 0.2°C per day. Based on the observed cooling rates, groundwater

temperatures are estimated to reach the baseline temperature, approximately 12.8°C, in September 2012 (Appendix B).

5.2 Groundwater Monitoring Well Sampling Results

The following groundwater sampling events are described in the paragraphs below:

- Spring 2011 Monitoring Event – April 5 and 6, 2011; and
- Fall 2011 Monitoring Event – December 9, 2011.

The results are compared to the Site cleanup goals, which are set at the current Federal/State drinking water Maximum Contaminant Levels (MCLs). Tables 2 and 3 describe the concentrations of detected VOCs in samples collected from groundwater monitoring wells during the Spring and Fall 2011 monitoring events, respectively. Figure 3 shows the monitoring well locations. Analytical laboratory results are provided in Appendix D.

Spring 2011 Monitoring Event

Three VOCs, TCE, cis-1,2-DCE, and vinyl chloride, were detected at concentrations above the Site cleanup goals, 5 µg/L, 70 µg/L, and 2 µg/L, respectively. TCE was detected at a concentration exceeding the cleanup goal in three of the 19 groundwater monitoring wells, TW-12, TW-24, and ERT-9, that were sampled. The highest TCE concentration was detected at TW-12 (at a concentration of 26 µg/L), located between source area and Mill Pond (Figure 4). Cis-1,2-DCE and vinyl chloride were detected (at concentrations of 87.5 µg/L and 2.5 µg/L, respectively) in one monitoring well, ERT-9, located northwest of Mill Pond.

Several other VOCs were detected at concentrations above the laboratory detection limits, but below the Site cleanup goals (trans-1,2-dichloroethene, tetrachloroethene, toluene, and total xylenes). In addition, five other VOCs were detected that do not have a Site cleanup goal. Acetone, 2-butanone, methylene chloride, carbon disulfide, and cyclohexane were detected at trace concentrations or below a concentration of 15 µg/L (Table 2).

Fall 2011 Monitoring Event

Similar to the Spring 2011 monitoring event, three VOCs, TCE, cis-1,2-DCE, and vinyl chloride, were detected at concentrations above the Site cleanup goals. Concentrations of TCE, cis-1,2-DCE, and vinyl chloride detected during the Fall 2011 monitoring event were consistent with the locations and concentrations detected during the Spring 2011 monitoring event.

TCE was detected at a concentration exceeding the cleanup goal in four of the 23 groundwater monitoring wells that were sampled, TW-12, TW-24, TW-31, and ERT-9. The highest TCE concentration was detected at TW-12 (at a concentration of 30 µg/L). Cis-1,2-DCE and vinyl chloride were also detected at concentrations (of 97 µg/L and 4.5 µg/L, respectively) exceeding the cleanup goal in one of the 23 groundwater monitoring well samples, ERT-9.

No other VOCs were detected during the Fall 2011 monitoring event.

5.3 Groundwater Extraction Well Sampling Results

Summaries of the groundwater extraction well sampling analytical laboratory results were provided by the EPA and MassDEP GWTF O&M contractors and are located in Appendix E. The following groundwater extraction well sampling events are briefly described in the paragraphs below:

- January 4, 2011 – EW-S4, EW-S5, EW-M1, EW-M2, EW-M3, and EW-G2;
- April 5, 2011 – EW-S4, EW-S5, EW-M1, EW-M2, EW-M3, and EW-G2;
- June 29, 2011 – EW-S1, EW-S2, EW-S3, EW-S4, EW-S5, EW-M1, EW-M3, EW-G1, and EW-G2; and
- October 21, 2011 – EW-S1, EW-S2, EW-S3, EW-S4, EW-S5, EW-M1, EW-M3, EW-G1, and EW-G2.

TCE was the only VOC detected at a concentration above the Site cleanup goal in extraction well samples during the 2011 extraction well sampling events. The following TCE concentrations were detected from extraction wells in 2011:

- January 2011 – EW-S4 (15 µg/L), EW-S5 (31 µg/L), and EW-M3 (6.3 µg/L);
- April 2011 – EW-S4 (19 µg/L) and EW-S5 (9.7 µg/L);

- June 2011 – EW-S3 (19 µg/L), EW-S4 (18 µg/L), and EW-S5 (5.7 µg/L); and
- October 2011 – EW-S1 (5.2 µg/L), EW-S3 (6.3 µg/L), and EW-S4 (15 µg/L).

In general, concentrations of TCE detected during the extraction well sampling events were relatively consistent. The maximum concentration of TCE detected was in groundwater extraction well EW-S5 at a concentration of 31 µg/L during the January 2011 sampling event.

5.4 Summary of Findings

The primary constituents of concern (COCs) at the Site are TCE and cis-1,2-DCE. The following sections describes recent TCE and cis-1,2-DCE data trends and plume delineation.

5.4.1 TCE and Cis-1,2-DCE Data Trends

Due to elevated temperatures in the source area, no monitoring wells were sampled in the source area during the Spring sampling event and only one, TW-31, which is located outside the ISTT treatment zone, was sampled during the Fall 2011 sampling event. Concentrations of TCE remained above the MCL in TW-31, consistent with previous sampling events (Table 4). Concentrations of cis-1,2-DCE in TW-31 did not exceed the MCL in 2011. Historically, concentrations in this monitoring well located outside the ISTT treatment zone have generally remained consistent (Table 5).

In downgradient groundwater monitoring wells, concentrations of TCE remained above the MCL in only three wells, TW-12, TW-24, and ERT-9, during the Spring and Fall 2011 sampling events. TCE concentrations in monitoring wells TW-12 and ERT-9 show a slight upward trend when compared to 2010 data (Table 4); however, concentrations remain within historical data ranges (Figure 6). TCE concentrations in TW-24 showed a slight downward trend in monitoring well TW-24 when compared to historic data (Figure 6). In general, TCE concentrations in the downgradient plume continue to exhibit a downward trend when compared to historical data.

Concentrations of cis-1,2-DCE remained above the MCL in ERT-9 in the Spring and Fall 2011 sampling events. Except for a brief downward trend in 2009, concentrations of cis-1,2-DCE in samples collected from ERT-9 have remained relatively steady since 2006 (Table 5).

5.4.2 Groundwater Plume Delineation

A plume map depicting the approximate limits of the overburden TCE plume in Fall 2011 is included as Figure 7. The plume limits were estimated using the TCE concentrations in groundwater samples collected in Fall (December) 2011. To further define source area TCE concentrations, data collected during the ISTT Remedial Action Confirmation Sampling Event No. 3 in August 2011 were also included in Figure 7 (Appendix A). An evaluation of the ISTT Remedial Action and associated Confirmation Sampling Events was included in the Remedial Action Report [Nobis 2011a].

The Fall 2011 TCE plume (TCE concentrations above the cleanup goal, 5 µg/L) extends from the source area north-northeast, consistent with groundwater flow direction and historic TCE plume depictions, to downgradient extraction wells, EW-S4 and EW-S5 (Figure 7). TCE was not detected above the MCL during 2011 at monitoring wells DEQE-7 and DEQE-8, located south of Mill Pond. Nearby extraction wells, EW-S4 and EW-S5, are located between wells DEQE-7 and DEQE-8 and had TCE concentrations slightly greater than the MCL during 2011 (EW-S4 averaged 16.8 µg/L and EW-S5 averaged 12.6 µg/L, Appendix E). These data indicate that the extraction wells appear to be capturing the plume in this area.

A cross-section showing estimated TCE concentration contours (Fall 2011) and the vertical extent of TCE concentrations in the overburden and bedrock groundwater is presented on Figure 8. The cross-section was developed using a limited selection of wells throughout the Site and provides a conceptual model for groundwater flow into and through bedrock. As previously described, data collected during the ISTT Remedial Action Confirmation Sampling Event No. 3 in August 2011 (Appendix A) were used to further define the source area TCE concentrations in groundwater. The concentration of TCE above the MCL in bedrock monitoring wells is estimated to extend from the source area to ERT-9 (at a concentration of 5.9 µg/L, only slightly above the MCL), located north of Mill Pond. Historically, concentrations of TCE in ERT-9 have varied; however, concentrations of TCE have remained relatively constant (below 10 µg/L) in bedrock monitoring well ERT-9 since Fall 2007 (Figure 6). This bedrock monitoring well is beyond the capture zone of EW-M1 [Nobis, 2011b]. The continuing presence of TCE in ERT-9 at levels higher than the MCL and those present in nearby overburden wells suggests that contaminated groundwater may be migrating in the bedrock beneath Mill Pond and bypassing the extraction well network to the west or beneath its capture zone.

5.4.3 Comparison with Historic Plume Extents

A plume map depicting the approximate limits of the overburden TCE plume in 2000, 2006, and 2011 is included as Figure 9. The current extent of TCE above the MCL has been reduced significantly when compared to historic plume extents. The TCE plume has reduced in size by approximately 95%, from 36 acres in 2000 to 1.8 acres in 2011. This trend is expected to continue as contaminant concentrations in the source area were significantly reduced by ISTT and downgradient contaminants naturally attenuate.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The selected remedy, MOM GWTF, has been effective in managing the migration of COCs at the Site. However, the following recommendations may help improve the overall effectiveness of the remedy.

- An evaluation of the GWTF (pumping rates, contaminant concentrations, etc.) should be performed to determine the potential need for changes in the groundwater extraction strategy for the source area and downgradient extraction wells following the completion of ISTT.

- An evaluation of natural attenuation processes (including an evaluation of existing historic chemical data and geochemical data) should be performed to evaluate the natural attenuation occurring at the Site. A comprehensive evaluation of historical groundwater data would provide a better understanding of existing degradation rates of the downgradient plume and the potential stimulation of biological activity resulting from ISTT operations within the source area. In addition, an evaluation may identify potential options for enhancement of the natural attenuation processes.

7.0 REFERENCES

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TABLES

Table 1
Summary of Sample Analyses and Quantities
Long-Term Groundwater Monitoring
Groveland Wells Site, Groveland, Massachusetts

Well Designation	Screen Interval (formation) (ft bgs)	Spring 2011	Fall 2011
		VOCs - SOM01.2	CAM VOCs - Method 8260B
Source Area / Valley Manufacturing[1]			
TW-12	44-54 (BR)	1	1
TW-24[2]	58-68 (BR)	2	2
TW-31	40.5-48.5 (BR)		1
RW-01	30-40 (OB)		
RW-02	41-51 (OB)		
RW-03	30-40 (OB)		
RW-04	29.5-39.5 (OB)		
RW-05	36-46 (OB)		
RW-06	26-36 (OB)		
RW-07	35-45 (OB)		
RW-07B	80-100 (BR)		
RW-08	39-49 (OB)		
RW-09	29.5-39.5 (OB)		
RW-10	29-39 (OB)		
RW-10B	55-75 (BR)		
North of Source Area			
103	87-97 (BR)	1	1
104	43-53 (OB)		1
108	88-98 (BR)	1	1
DEQE-6	45-55 (OB)	1	1
ERT-9[2]	59-69 (BR)	2	2
ERT-11	4-14 (OB)	1	1
ERT-13	39-49 (OB)	1	1
ERT-16	41-51 (OB)	1	1
DEQE-4-2	39-49 (OB)	1	1
DEQE-13D	34-44 (OB)	1	1
ME-10D	66-76 (OB)	1	1
ME-20D	62.7-72.7 (OB)		1
109	82-92 (BR)		1
114	69-79 (BR)	1	1
NUS-4A	85-105 (BR)	1	1
TW-49S[3]	5-15 (SO)	1	4
TW-49D[3]	45-55 (OB)	1	4
TW-49R[3]	90-100 (BR)	1	4
DEQE-7	18-28 (OB)	1	1
DEQE-8	8-13 (SO)	1	1
Total Field Samples		**21**	**34**
NUMBER OF WELLS SAMPLED		**19**	**23**

Table 1
Summary of Sample Analyses and Quantities
Long-Term Groundwater Monitoring
Groveland Wells Site, Groveland, Massachusetts

Notes:

(1) Because the groundwater in the source area remained at elevated temperatures following In Situ Thermal Treatment operations, limited sampling of source area groundwater monitoring wells was conducted in 2011. Groundwater sampling of source area monitoring wells will resume when groundwater temperatures return to the baseline temperature.

(2) A field duplicate was collected at this location during the Spring and Fall 2011.

(3) During the Fall 2011 event, samples were collected using low-stress/low-flow procedures. During the Spring 2011 event, samples were collected using the passive diffusion bag (PDB) technology. Four PDBs were deployed across the well screen to determine the best depth for future sampling.

BR - Bedrock

SO - Shallow Overburden

OB - Overburden

ft bgs - Feet Below Ground Surface

SOM01.2 - USEPA, 2007

CAM - Mass DEP Compendium of Analytical Methods, 2010

Table 2
Analytical Results and Maximum Contaminant Levels for Volatile Organic Compounds Detected in Groundwater (µg/L) - Spring 2011
Groveland Wells Superfund Site
Groveland, Massachusetts

	Analyte	Vinyl chloride	Acetone	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene	Methylene chloride
Maximum Contaminant Level [1]		2	NA	100	70	5	NA
Area / Well ID	Zone						
North of Source Area							
103	BR	0.5 U	9.8	0.5 U	16	1.6	0.5 U
108	BR	0.5 U	11	0.5 u	0.68	1.5	0.25 JB
114	BR	0.5 U	10	0.5 U	1	0.5 U	0.19 JB
DEQE-4-2	OB	0.5 U	12	0.5 U	0.61	1.3	0.5 U
DEQE-6	OB	0.5 U	9.7	0.5 U	0.81	3.6	0.25JB
DEQE-7	OB	0.5 U	10	0.5 U	0.5 U	0.5 U	0.25
DEQE-8	OB	0.5 U	12	0.5 U	0.31 J	0.24 J	0.21 JB
DEQE-13D	OB	0.5 U	10	0.5 U	0.5 U	0.5 U	0.22 JB
ERT-9[2]	BR	**2.5**	12	0.48	**87.5**	**6.9**	0.24 JB
ERT-11	OB	0.5 U	11	0.5 U	0.5 U	0.5 U	0.2 JB
ERT-13	OB	0.5 U	11	0.5 U	0.5 U	0.67	0.28 JB
ERT-16	OB	0.5 U	11	0.5 U	0.5 U	0.5 U	0.32 JB
ME-10D	OB	0.5 U	11	0.5 U	0.33 J	0.27 J	0.23 JB
NUS-4A	BR	0.5 U	9.9	0.5 U	0.5 U	0.25 J	0.25 JB
TW-12	BR	*5 U*	16 B	5 U	3.2 J	**26**	1.7 JB
TW-24[2]	BR	0.5 U	11 B	5 U	0.54 J	**19**	1.75 J
TW-49S[3]	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.26 JB
TW-49D[3]	OB	0.5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW-49R[3]	BR	0.5 U	6.6 B	0.5 U	0.23 J	0.71	0.23 JB

Notes: Samples collected on April 5 and 6, 2011 by Nobis Engineering, Inc.

Unless otherwise noted, samples were collected using Passive Diffusion Bag Technology.

(1) Maximum Contaminant Level (MCL)-Federal/Massachusetts MCL current as of July 2010. MCL/MMCL set as the Interim Site Cleanup Level (IGCL) in the Record of Decision (USEPA, 1991).

(2) A field duplicate was collected for this location; the value presented is the average of the two detections.

(3) Groundwater samples were collected using low flow sampling techniques.

BOLD/SHADE - Detected concentration exceeds the applicable MCL.

ITALICS - Detection limit is greater than the applicable MCL.

OB - Overburden

BR - Bedrock

NA - No cleanup goal or MCL set for this parameter.

J - For Tier I validated data: Quantitation is estimated as it is below the sample-specific detection limits (SSDL).

U - Not detected above the SSDL. SSDLs are reported from the analysis for which all detected compounds were within calibration range.

B - Analyte detected in a laboratory blank.

Table 2
Analytical Results and Maximum Contaminant Levels for Volatile Organic Compounds Detected in Groundwater (µg/L) - Spring 2011
Groveland Wells Superfund Site
Groveland, Massachusetts

	Analyte	Tetrachloroethene	Carbon disulfide	Xylene (total)	Chloroform	Toluene	Cyclohexane
Maximum Contaminant Level [1]		5	NA	10,000	NA	1,000	NA
Area / Well ID	Zone						
North of Source Area							
103	BR	0.58	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
108	BR	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
114	BR	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DEQE-4-2	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DEQE-6	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DEQE-7	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DEQE-8	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DEQE-13D	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ERT-9[2]	BR	0.22	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ERT-11	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ERT-13	OB	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ERT-16	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ME-10D	OB	0.15 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
NUS-4A	BR	0.13 J	0.2 J	0.5 U	0.5 U	0.5 U	0.5 U
TW-12	BR	5 U	5 U	5 U	5 U	5 U	1.6 JB
TW-24[2]	BR	5 U	5 U	5 U	5 U	5 U	1.65 JB
TW-49S[3]	OB	0.085 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW-49D[3]	OB	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW-49R[3]	BR	0.5 U	0.23 J	0.15 J	4.6	3.2	0.5 U

Notes: Samples collected on April 5 and 6, 2011 by Nobis Engineering, Inc.

Unless otherwise noted, samples were collected using Passive Diffusion Bag Technology.

(1) Maximum Contaminant Level (MCL)-Federal/Massachusetts MCL current as of July 2010. MCL/MMCL set as the Interim Site Cleanup Level (IGCL) in the Record of Decision (USEPA, 1991).

(2) A field duplicate was collected for this location; the value presented is the average of the two detections.

(3) Groundwater samples were collected using low flow sampling techniques.

BOLD/SHADE - Detected concentration exceeds the applicable MCL.

ITALICS - Detection limit is greater than the applicable MCL.

OB - Overburden

BR - Bedrock

NA - No cleanup goal or MCL set for this parameter.

J - For Tier I validated data: Quantitation is estimated as it is below the sample-specific detection limits (SSDL).

U - Not detected above the SSDL. SSDLs are reported from the analysis for which all detected compounds were within calibration range.

B - Analyte detected in a laboratory blank.

Table 3
Analytical Results and Maximum Contaminant Levels for Volatile Organic Compounds Detected in Groundwater (µg/L) - Fall 2011
Groveland Wells Superfund Site
Groveland, Massachusetts

	Analyte	Vinyl chloride	cis-1,2-Dichloroethene	Trichloroethene
Maximum Contaminant Level[1]		2	70	5
Area / Well ID	Zone			
Source Area / Valley Mfg				
TW-31	BR	2.0 U	1.3	**13**
North Source Area				
103	BR	2.0 U	14	2.1
104	OB	2.0 U	12	1.0 U
108	BR	2.0 U	1.0 U	2.2
109	OB	2.0 U	1.0 U	1.0 U
114	BR	2.0 U	1.5	1.0 U
DEQE-4-2	OB	2.0 U	1.0 U	1.6
DEQE-6	OB	2.0 U	1.3	3.3
DEQE-7	OB	2.0 U	1.0 U	1.0 U
DEQE-8	OB	2.0 U	1.0 U	1.0 U
DEQE-13D	BR	2.0 U	1.0 U	1.0 U
ERT-9[2]	BR	**4.5**	**97**	**5.9**
ERT-11	OB	2.0 U	1.0 U	1.0 U
ERT-13	OB	2.0 U	1.0 U	1.0 U
ERT-16	OB	2.0 U	2.3	3.1
ME-10D	OB	2.0 U	1.0 U	1.0 U
ME-20D	OB	2.0 U	1.0 U	1.0 U
NUS-4A	BR	2.0 U	1.0 U	1.0 U
TW-12	BR	2.0 U	3.6	**30**
TW-24[2]	BR	2.0 U	1.0 U	**17**
TW-49S[3]	OB	2.0 U	1.0 U	1.0 U
TW-49D[3]	OB	2.0 U	1.0 U	1.0 U
TW-49R[3]	BR	4.0 U[4]	3.5	2.0 U

Notes:
(1) Maximum Contaminant Level (MCL)-Federal/Massachusetts MCL/MMCL .
MCL/MMCL (USEPA, January 2011; MassDEP Spring 2010). MCL/MMCL set as the Interim Site Cleanup Level (IGCL) in the Record of Decision (USEPA, 1991).
(2) A field duplicate was collected for this location; the value presented is the average of the two detections.
(3) Each monitoring well had four PDBs installed across the well screen. The reported result is the highest concentration detected.
BOLD/SHADE - Detected concentration exceeds the applicable MCL.
ITALICS - Detection limit is greater than the applicable MCL.
OB - Overburden
BR - Bedrock
U - Not detected above the SSDL. SSDLs are reported from the analysis for which all detected compounds were within calibration range.

Table 4
Trichloroethene Concentrations Detected in Groundwater - Spring 2005 through Fall 2011
Groveland Wells Superfund Site
Groveland, Massachusetts

	Analyte	Trichloroethene (µg/L)													
	Date	04/05	10/05	04/06	09/06	05/07	9/07	4/08	10/08	05/09	10/09	05/10	10/10	04/11	12/11
Monitoring Well	Screen	Maximum Contaminant Level - 5 µg/L													
Source Area / Valley Manufacturing															
TW-3	OB	NS	**120**	NS	**74** [1]	NS	**14**	NS	**22**	NS	--	--	--	--	--
TW-17	OB	**24,000 D**	**73,000 D**	**12,000** [1]	**2,800 D**	**360** [1]	**1,500 D**[1]	**1,600 D**	**1,350 D**	**340**	--	--	--	--	--
TW-26	BR	NS	**31**	NS	**31**	NS	**600 D**	NS	**48**	NS	--	--	--	--	--
TW-26A	OB	NS	**47**	NS	**1,300 D**	**420**	**180**	**110**	**53**	**62**	--	--	--	--	--
TW-30	BR	10 U	0.20 J	NS	0.52	NS	0.16 J	NS	0.50 U	NS	--	--	--	--	--
TW-31	BR	**15**	**21**	NS	**22**	NS	**13**	NS	**6.1**	NS	5 J	3 J	NS	NS	**13**
North of Source Area															
103	BR	NS	2.6	NS	2.4	NS	1.8	1.9	1.8	0.94	0.93	1	1.2	1.6	2.1
104	OB	NS	0.90 J	NS	1.1	NS	0.94	NS	0.38 J	NS	0.28 J	NS	0.43 J	NS	1.0 U
109	BR	NS	NS	0.5 U	NS	0.5 U	NS	NS	0.5 U	NS	0.5 U	NS	0.5 U	NS	1.0 U
114	BR	NS	NS	0.5 U	NS	0.5 U	NS	0.16 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U
No. 3	BR	NS	NS	0.5 U	NS	NS	NS	NS	NS	NS	NS	NS	NS		
108	BR	NS	3.8	3.2	4.4	4.5	0.50 U	2.8	3.2	1.3	1.3	1.3	2	1.5	2.2
TW-49S	OB													0.5 U[2]	1.0 U[3]
TW-49D	OB													0.5 U[2]	1.0 U[3]
TW-49R	BR													0.71[2]	2.0 U[3]
ERT-9	BR	**18**	**21**	**17 J**	**15**	**25** [1]	**7.2**[1]	**9.4**[1]	**6.5**	3.3 D[1]	2.81 [1]	3.1 J[1]	**5.1**	**6.9**	**5.9**
ERT-11	OB	NS	0.50 U	NS	1.3	NS	0.28 J	NS	0.29 J	NS	0.24	0.5 U	0.5 U	0.5 U	1.0 U
ERT-13	OB	3.0	2.0	2.0 [1]	2.8 [1]	2.2J	1.4	1.5	1.25	0.77	0.65	0.9	0.53	0.67	1.0 U
ERT-16	OB	NS	NS	0.61	NS	1.4	0.63	0.37 J	0.31 J	0.5 U	0.5 U	0.5 U	0.69	0.5 U	3.1
DEQE-6	OB	NS	2.4	**7.4**	**5.6**	2.9	1.5	0.58	0.7	2.2	1.1	2.2	2.7	3.6	3.3
DEQE-4-2	OB	4.3	2.6	2.4	2.4	3.5	2.3	2.1	2.3	1.1	0.76	1.1	1.2	1.3	1.6
DEQE-13D	OB	NS	0.28 J	NS	0.50 U	NS	NS	NS	0.26 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U
ME-10D	OB	NS	0.21 J	NS	0.50 U	NS	1	NS	0.39 J	NS	0.28 J	0.19 J	0.5 U	0.27 J	1.0 U
ME-20D	OB	NS	0.50 U	NS	0.50 U	NS	NS	NS	0.50 U	NS	0.68	NS	0.5 U	NS	1.0 U
DEQE-7	OB	NS	0.20 J	NS	0.50 U	NS	0.50 U	NS	0.50 U	NS	0.5 U	0.39 J	0.5 U	0.5 U	1.0 U
DEQE-8	OB	NS	0.20 J	0.39 J	0.46 J	NS	0.34 J	**16**	0.50 U	0.5 U	0.38 J	0.5 U	0.3 J	0.24 J	1.0 U
TW-12	BR	**19**	**41**	**41**	**41**	**9.9**	NS	**19**	**15**	**16**	**6.1**	**15**	NS	**26**	**30**
TW-24	BR	**32**	**62**	**43 J**	**100**	**51**	**78**	**30.5**[1]	**85**	**26.5 D**[1]	**25 D**[1]	**51**	**34**	**19**	**17**

Notes:

All groundwater samples were collected using PDB technology unless otherwise noted.
1 A field duplicate was collected at this location and the value reported is the average of the two detections.
2 Samples were collected using low flow sampling methods.
3 Samples were collected using four PDBs installed across well screen. The reported result is the highest concentration detected.
-- Monitoring well was abandoned in July 2009 in preparation for ISTT operations
BOLD/SHADE Detected concentration exceeds the applicable Interim Groundwater Cleanup Level.
BR - Bedrock
OB - Overburden
NS - Not Sampled
U - Not detected above the SSDL.
D - Concentration is reported from a dilution of the sample.
J - Quantitation is estimated as it is below the sample-specific detection limits (SSDL).

Table 5
Cis-1,2-Dichloroethene Concentrations Detected in Groundwater - Spring 2005 through Fall 2011
Groveland Wells Superfund Site
Groveland, Massachusetts

	Analyte	**cis-1,2-Dichloroethene (µg/L)**													
	Date	**04/05**	**10/05**	**04/06**	**09/06**	**05/07**	**09/07**	**4/08**	**10/08**	**05/09**	**10/09**	**5/10**	**10/10**	**04/11**	**12/11**
Monitoring Well	**Screen**	**Maximum Contaminant Level - 70 µg/L**													
Source Area / Valley Manufacturing															
TW-3	OB	NS	**97**	**560 J[1]**	52 [1]	NS	6.6	NS	8.5	NS	--	--	--	--	--
TW-17	OB	**1,100 DJ**	**170**	**560**	**250 D**	**230 [1]**	**72[1]**	**240 D**	**515 D[1]**	**280**	--	--	--	--	--
TW-26	BR	NS	7 J	NS	7.9	NS	24	NS	9.5	5.0 U	--	--	--	--	--
TW-26A	OB	NS	30	NS	**160**	**880**	**95**	**170**	65	59	--	--	--	--	--
TW-30	BR	10 U	0.50 U	NS	0.50 U	NS	0.50 U	NS	0.50 U	NS	--	--	--	--	--
TW-31	BR	10 U	10 U	NS	5.0 U	NS	5.0 U	NS	5.0 U	NS	5 U	5.0 U	NS	NS	1.3
North of Source Area															
103	BR	NS	17	NS	13	NS	9.8	13	13	7.3	8.4	11	15	16	14
104	OB	NS	25	NS	22 D	NS	38 D	NS	8.6	NS	4.1	NS	23 D	NS	12
109	BR	NS	NS	0.50 U	NS	0.50U	NS	NS	0.50 U	NS	0.5 U	NS	0.5 U	NS	1.0 U
114	BR	NS	NS	2.0	NS	3.4J	NS	1.9	1.2	0.45 J	0.31 J	0.5	0.82	1	1.5
No. 3	BR	NS	NS	0.50 U	NS	NS	NS	NS	NS	NS	NS	NS	NS		
NUS-4A	BR	NS	NS	0.50 U	NS	0.50U	NS	0.12 J	0.50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U
108	BR	NS	1.8	1.3	1.9	2.2J	0.50 U	1.4 J	1.3	0.59	0.65	0.53	1.2	0.68	1.0 U
TW-49S	OB													0.5 U[2]	1.0 U[3]
TW-49D	OB													0.5 U[2]	1.0 U[3]
TW-49R	BR													0.23 J[2]	3.5[3]
ERT-9	BR	**210 D**	**120 D**	**140**	**100 D**	**155 J[1]**	**91 D[1]**	**130 D[1]**	**84 D**	47	40.5 D	61	**90 D**	**87.5**	**97**
ERT-11	OB	NS	0.50 U	NS	0.58	NS	0.50 U	NS	0.50 U	NS	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U
ERT-13	OB	0.95 U	0.63	0.80 [1]	1.1 [1]	0.48J	0.46 J	0.47 J	0.37 J[1]	0.34 J	0.27 J	0.52	0.5 U	0.5 U	1.0 U
ERT-16	OB	NS	NS	0.50 U	NS	0.41J	0.24 J	0.50 U	0.50 U	0.5 U	0.5 U	0.5 U	0.56	0.5 U	2.3
DEQE-6	OB	NS	0.16 J	1.9	2.0	0.78J	0.19 J	0.50 U	0.50 U	0.71	0.5 U	0.3	0.72	0.81	1.3
DEQE-4-2	OB	2.2	1.8	0.93	0.97	1.9J	2.2	1.2	0.83	0.6	0.39 J	0.81	0.94	0.61	1.0 U
DEQE-13D	OB	NS	0.50 U	NS	0.50 U	NS	NS	NS	0.50 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U
ME-10D	OB	NS	0.11 J	NS	0.50 U	NS	0.15 J	NS	0.3 J	NS	0.5 U	0.5 U	0.5 U	0.33 J	1.0 U
ME-20D	OB	NS	0.50 U	NS	0.50 U	NS	NS	NS	0.50 U	NS	0.34	NS	0.5 U	NS	1.0 U
DEQE-7	OB	NS	0.50 U	NS	0.50 U	NS	0.50 U	NS	0.50 U	NS	0.5 U	0.5 U	0.5 U	0.5 U	1.0 U
DEQE-8	OB	NS	0.50 U	0.50 U	0.49 J	NS	1.1	1.1	0.50 U	0.50 U	0.76	0.5 U	0.5	0.31 J	1.0 U
TW-12	BR	10 U	10 U	3 J	3.4 J	5.0 U	NS	1.1 J	5.0 U	1.4 J	5 U	5.0 U	NS	3.2 J	3.6
TW-24	BR	10 U	10 U	10 U	20	5.6	3.8 J	1.4 J[1]	2.3 J	5.0 U	0.56	5.0 U	5.0 U	0.54 J	1.0 U

Notes:

All groundwater samples were collected using PDB technology unless otherwise noted.

1 A field duplicate was collected at this location and the value reported is the average of the two detections.

2 Samples were collected using low flow sampling methods.

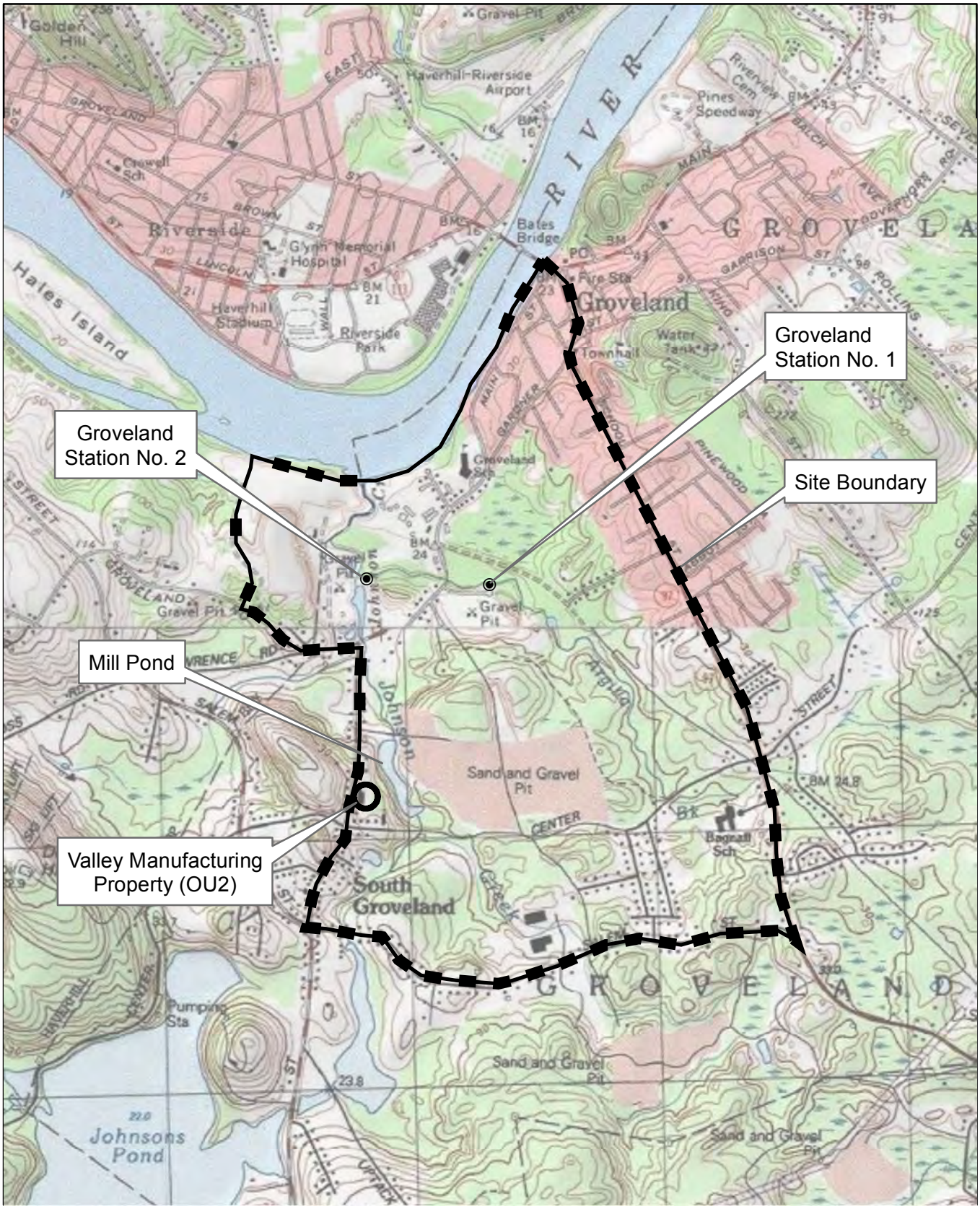
3 Samples were collected using four PDBs installed across well screen. The reported result is the highest concentration detected.

-- Monitoring well was abandoned in July 2009 in preparation for ISTT operations

BOLD/SHADE Detected concentration exceeds the applicable Interim Groundwater Cleanup Level.

BR - Bedrock
OB - Overburden
NS - Not Sampled
U - Not detected above the SSDL.
D - Concentration is reported from a dilution of the sample.
J - Quantitation is estimated as it is below the sample-specific detection limits (SSDL).

FIGURES



0 1,250 2,500 5,000

Feet

1 inch = 2,500 feet

N

Location of all features is approximate. Map is for reference purposes only. Nobis Engineering, Inc. makes no claims, warranties, representations, expressed or implied, relating to the completeness, accuracy, or reliability of the data shown.

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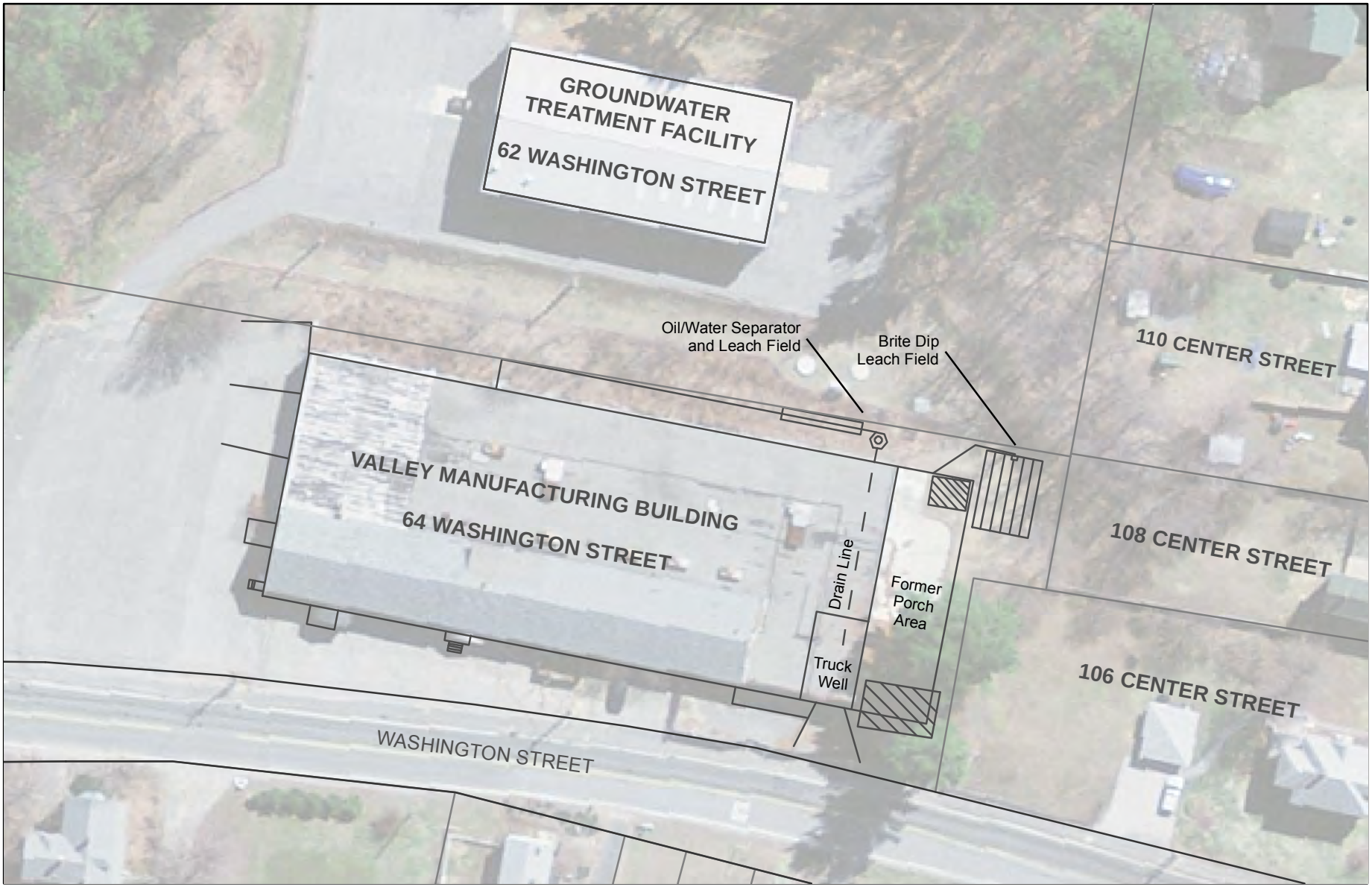
FIGURE 1

SITE LOCUS PLAN
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH | CHECKED BY: DB

PROJECT NO. 81015 | DATE: APRIL 2012

Path: O:\Active\81000 SARS\81015.00 Groveland LTM\GIS\Fig_1_Site_Locus_Plan.mxd Date Printed: 4/23/2012



Legend

Approximate Location of Former Underground Storage Tanks

N

0 15 30 60

Feet

1 inch = 60 feet

Notes:

1. Aerial photograph provided by MassGIS.

2. Location of all features is approximate. Map is for reference purposes only. Nobis Engineering, Inc. makes no claims, warranties, representations, expressed or implied, relating to the completeness, accuracy, or reliability of the data shown.

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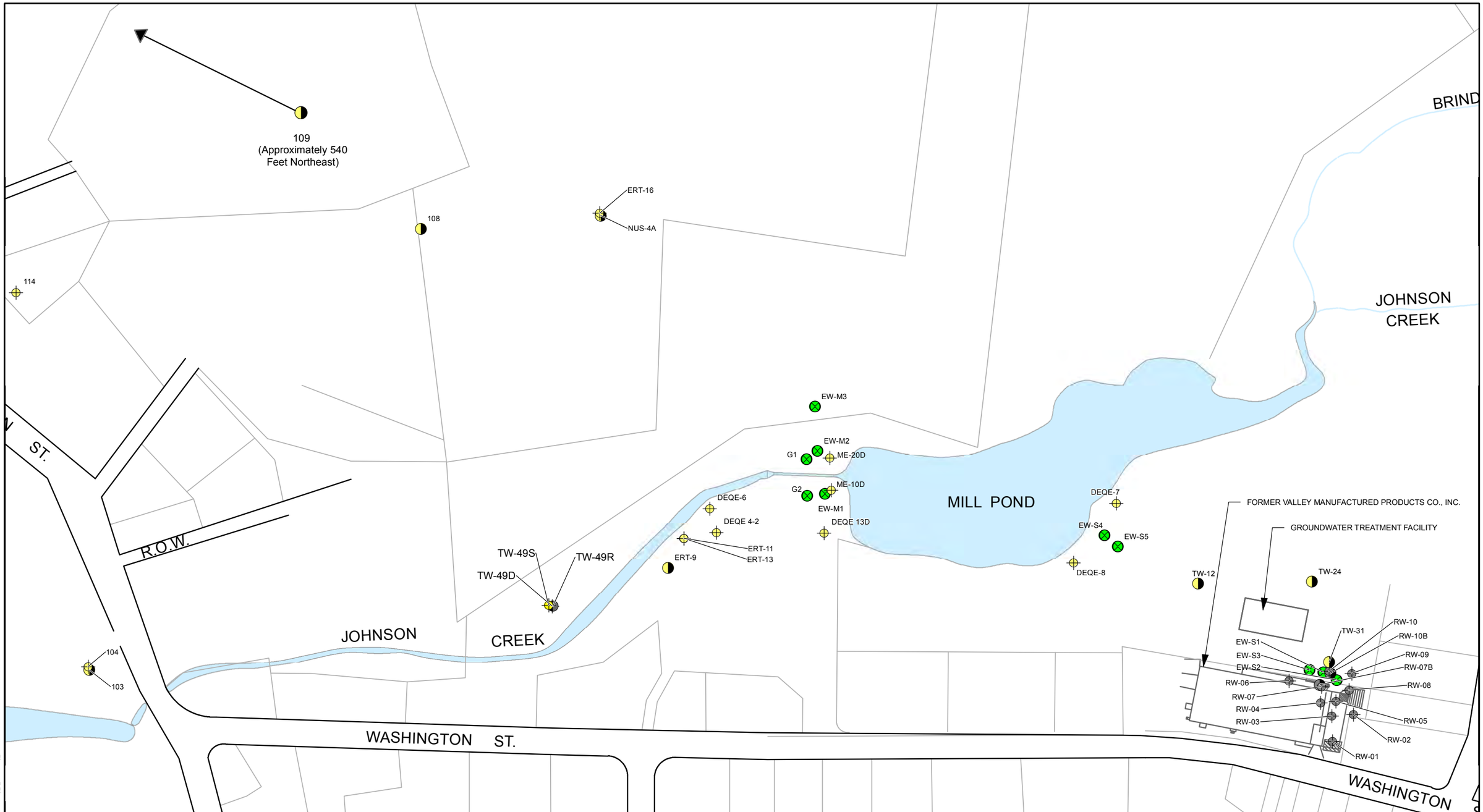
FIGURE 2

VALLEY MANUFACTURING
PROPERTY SITE PLAN
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: APRIL 2012

Path: O:\Active\81000 SARSS\81015.00 Groveland LTM\GIS\Fig_2_Site Plan.mxd Date Printed: 4/23/2012



Legend

- Bedrock Monitoring Well Included in 2011 Monitoring
- Bedrock Monitoring Well Not Included in 2011 Monitoring
- Overburden Monitoring Well Included in 2011 Monitoring
- Overburden Monitoring Well Not Included in 2011 Monitoring
- Existing Extraction Well

N

0 100 200 400

Feet

1 inch = 175 feet

Notes:

1. The current limits of Mill Pond are typically smaller than depicted, and are subject to seasonal fluctuations.

2. Duplicate samples were collected from monitoring wells ERT-9 and TW-24 in the Spring and Fall 2011 sampling events.

3. Location of all features is approximate. Map is for reference purposes only. Nobis Engineering, Inc. makes no claims, warranties, representations, expressed or implied, relating to the completeness, accuracy, or reliability of the data shown.

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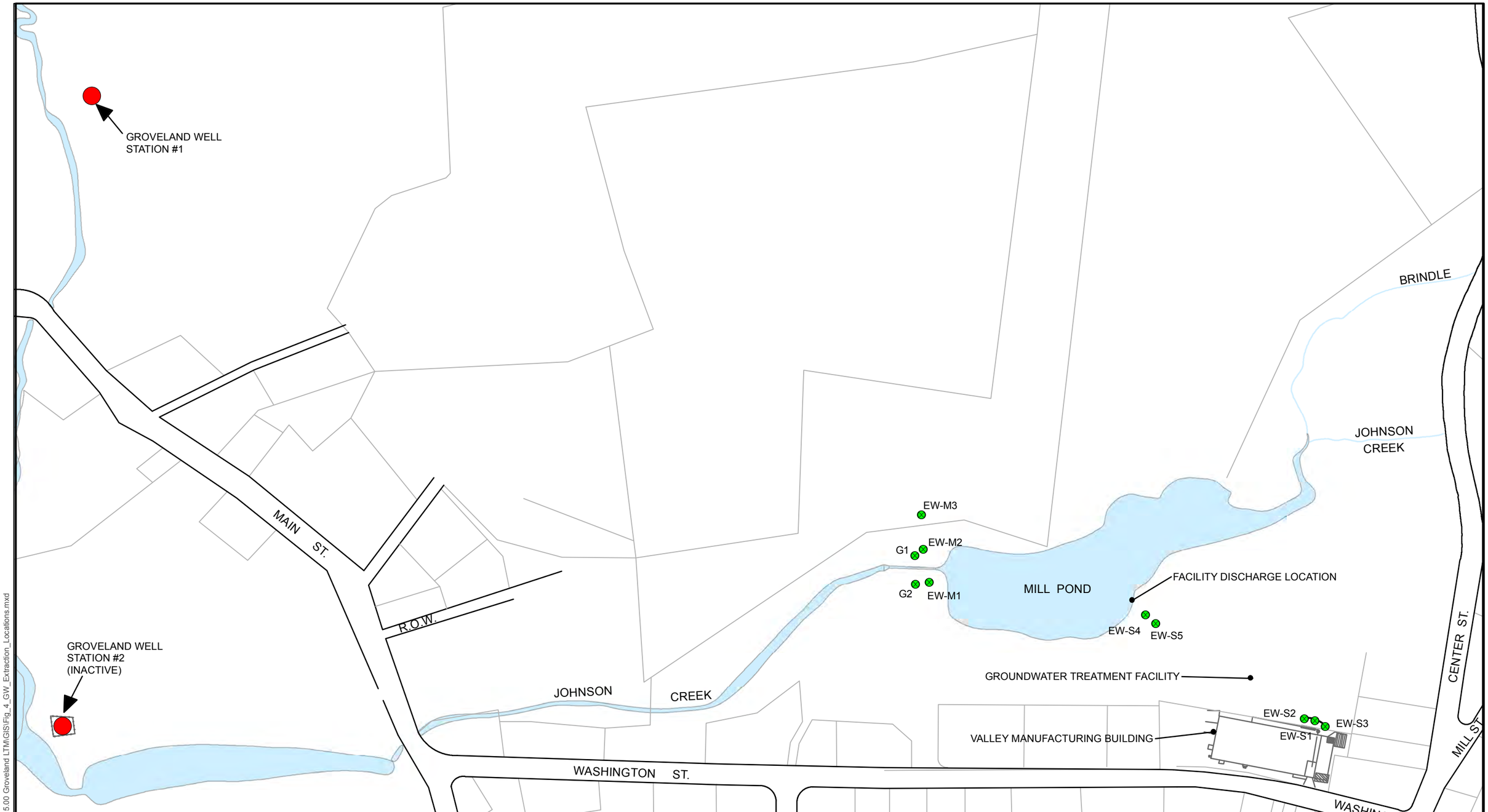
FIGURE 3

GROUNDWATER MONITORING LOCATIONS - 2011
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: JUNE 2012

Path: O:\Active\81000 SARS\81015.00 Groveland LT M\GIS\Fig_3_Monitoring_Locations.mxd Date Printed: 6/14/2012



Legend

- Existing Extraction Well
- Public Water Supply Well

N

0 100 200 400

Feet

1 inch = 225 feet

Notes:

1. The current limits of Mill Pond are typically smaller than depicted, and are subject to seasonal fluctuations.

2. Location of all features is approximate. Map is for reference purposes only. Nobis Engineering, Inc. makes no claims, warranties, representations, expressed or implied, relating to the completeness, accuracy, or reliability of the data shown.

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FIGURE 4

GROUNDWATER EXTRACTION LOCATIONS
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: JUNE 2012

Path: O:\Active\81000 SARSS\81015.00 Groveland LTM\GIS\Fig_4_GW_Extraction_Locations.mxd

Notes:

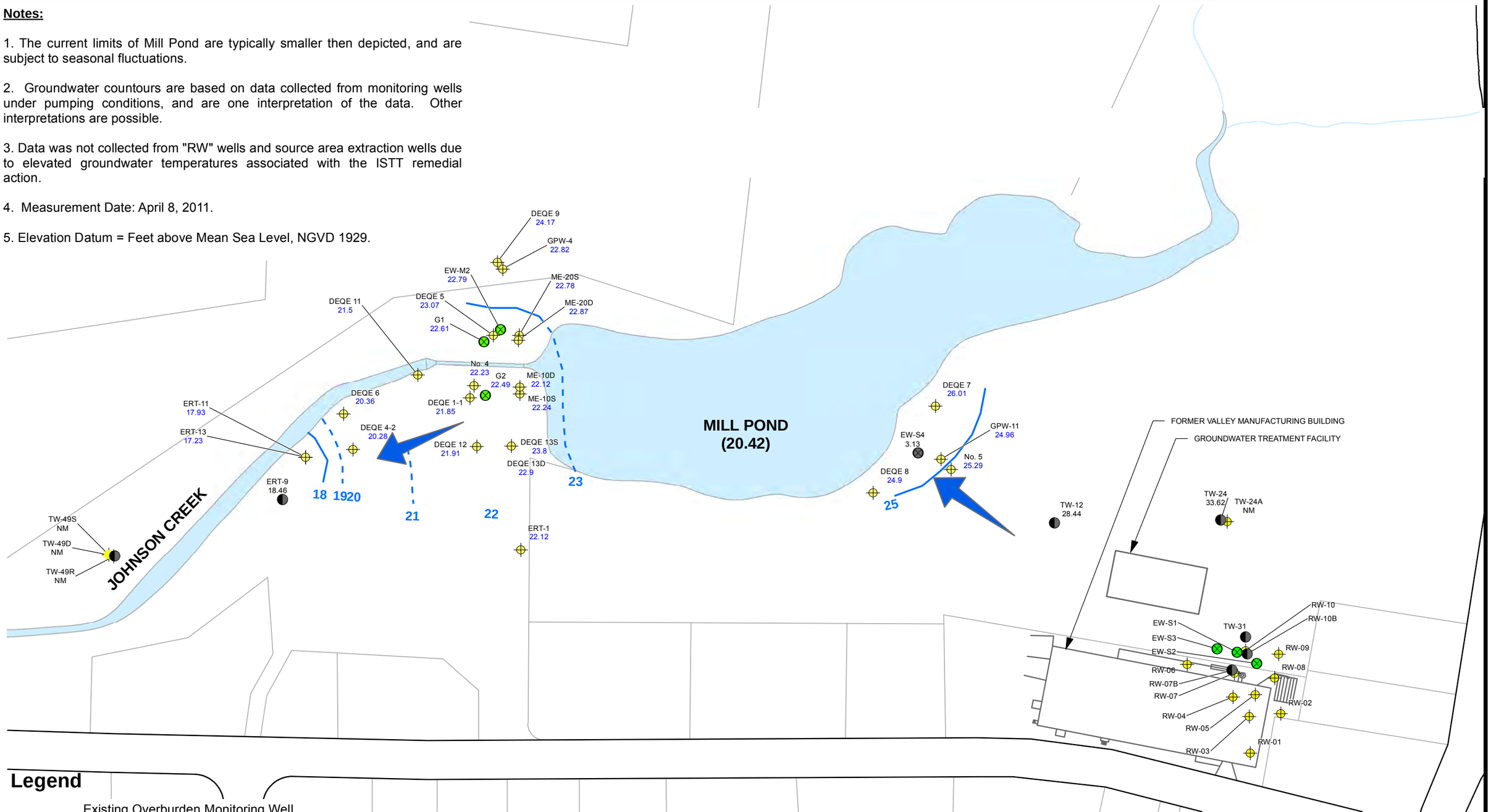
1. The current limits of Mill Pond are typically smaller then depicted, and are subject to seasonal fluctuations.

2. Groundwater countours are based on data collected from monitoring wells under pumping conditions, and are one interpretation of the data. Other interpretations are possible.

3. Data was not collected from "RW" wells and source area extraction wells due to elevated groundwater temperatures associated with the ISTT remedial action.

4. Measurement Date: April 8, 2011.

5. Elevation Datum = Feet above Mean Sea Level, NGVD 1929.



Legend

ERT-11 18.00 — Existing Overburden Monitoring Well Used in 2010 Water Level Monitoring With Water Level (Potentiometric Head Measured in ft MSL)

EW-M2 23.53 — Existing Overburden Extraction Well

22 — Groundwater Contour in Overburden with Elevation Dashed Where Inferred

NM — Not Measured

Approximate Groundwater Flow Direction

ERT-9 18.49 — Existing Bedrock Monitoring Well

EW-S4 10.69 — Existing Bedrock Extraction Well

N

APPROXIMATE SCALE

120 60 0 120 Feet

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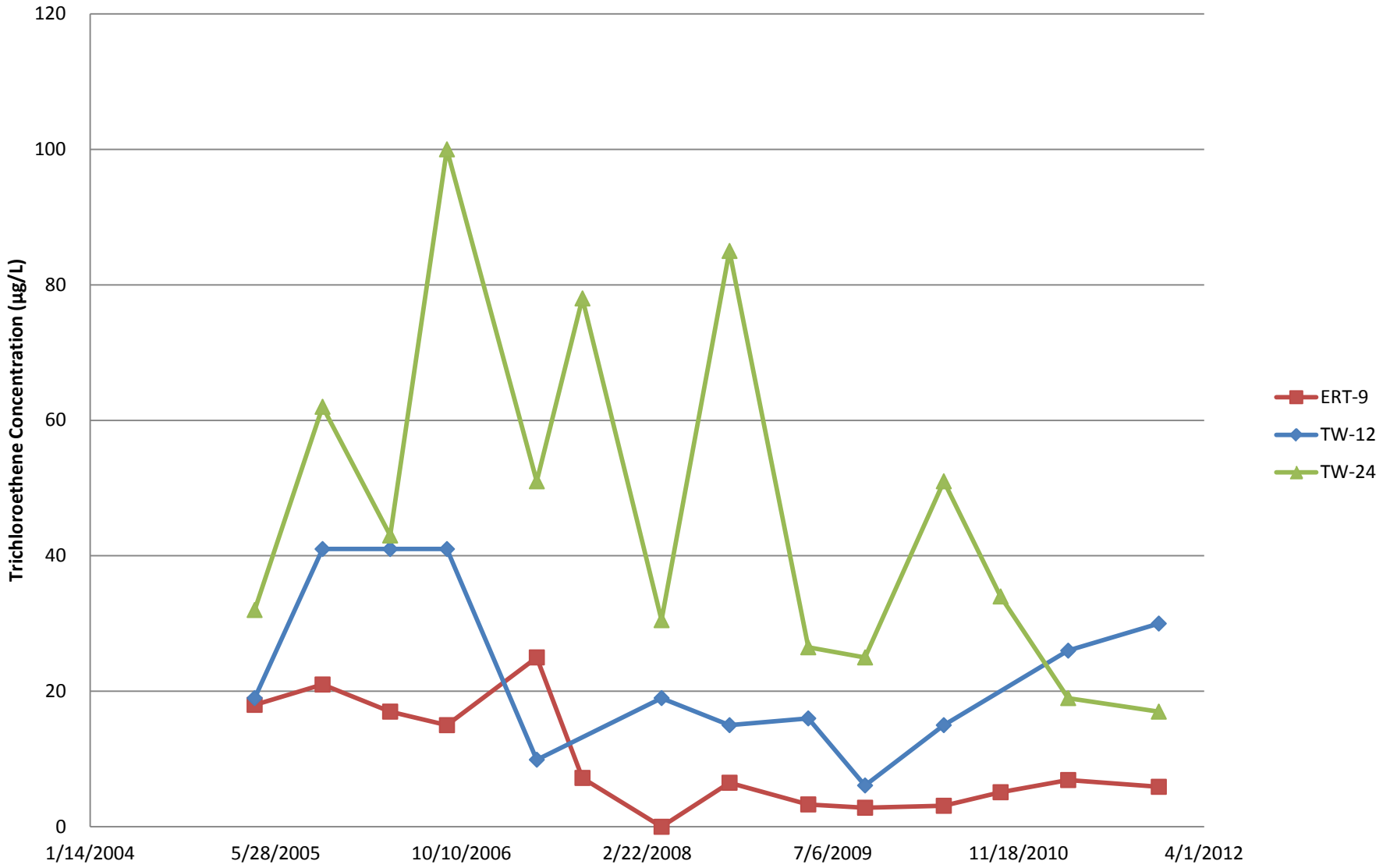
FIGURE 5

ESTIMATED OVERBURDEN GROUNDWATER ELEVATION CONTOURS - SPRING 2011
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: JUNE 2012

Path: O:\Active\81000 SARSS\81015.00 Groveland LTM\GIS\Fig_5_Spring_2011_OB.mxd\Fig_5_Spring_2011_OB.mxd Date Printed: 6/22/2012

Figure 6
TCE Concenrations in ERT-9, TW-12, and TW-24
Groveland Wells Superfund Site
Groveland, Massachusetts



Notes:

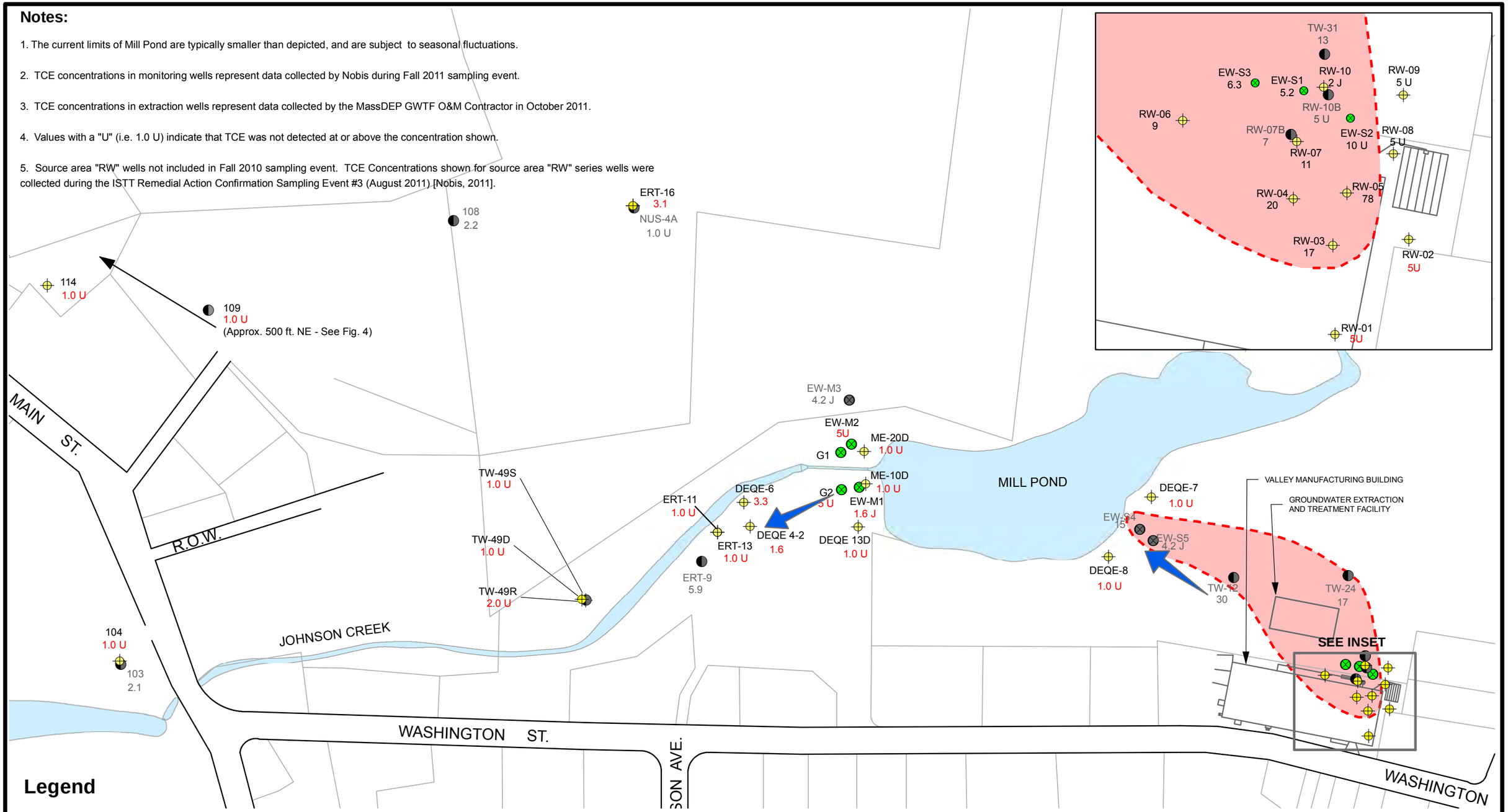
1. The current limits of Mill Pond are typically smaller than depicted, and are subject to seasonal fluctuations.

2. TCE concentrations in monitoring wells represent data collected by Nobis during Fall 2011 sampling event.

3. TCE concentrations in extraction wells represent data collected by the MassDEP GWTF O&M Contractor in October 2011.

4. Values with a "U" (i.e. 1.0 U) indicate that TCE was not detected at or above the concentration shown.

5. Source area "RW" wells not included in Fall 2010 sampling event. TCE Concentrations shown for source area "RW" series wells were collected during the ISTT Remedial Action Confirmation Sampling Event #3 (August 2011) [Nobis, 2011].



Legend

DEQE-8 0.3	Overburden Monitoring Well with TCE Concentration µg/L
EW-M1 6.4	Overburden Extraction Well with TCE Concentration µg/L
	Estimated Extent of Overburden TCE Concentrations Exeeding MCL
	Approximate Groundwater Flow Direction
EW-M3 26	Bedrock Extraction Well with TCE Concentration µg/L
108 2	Bedrock Monitoring Well with TCE Concentration µg/L

APPROXIMATE SCALE

240 120 0 240 Feet

INSET SCALE

50 25 0 50 Feet

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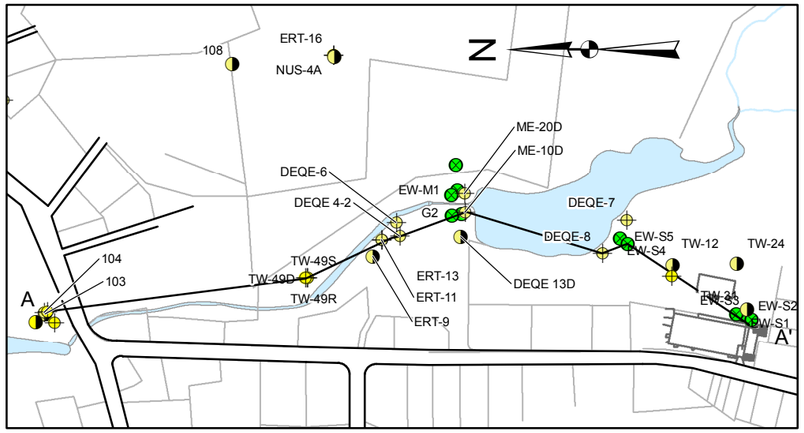
FIGURE 7

OVERBURDEN TCE PLUME
FALL 2011
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: JUNE 2012

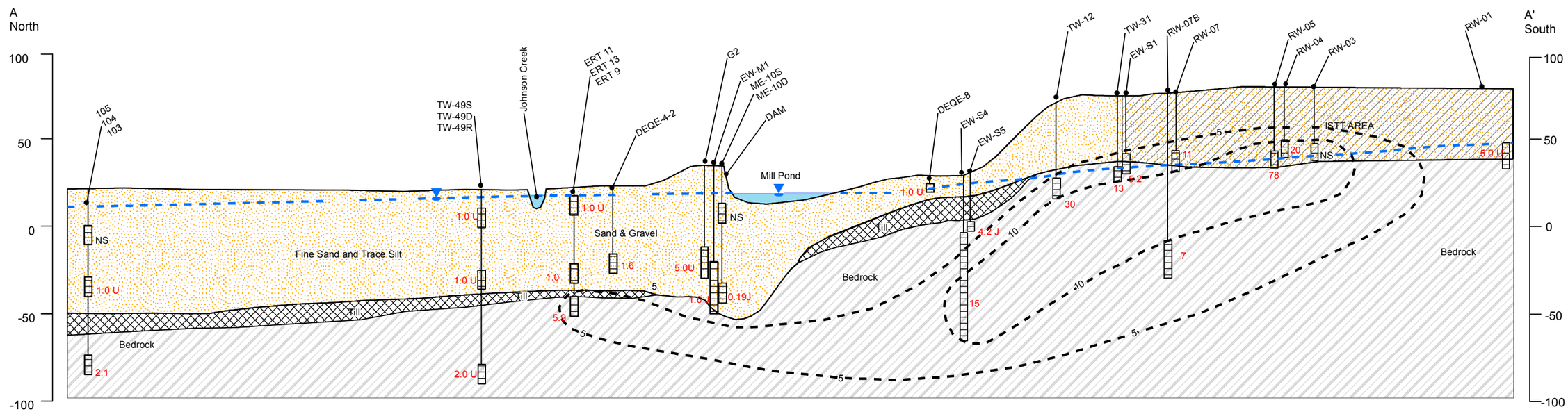
Path: O:\Active\81000 SARS\81015.00 Groveland LTMG\IS\Fig_7_OB_Plume.mxd\Fig_7_OB_Plume.mxd Date Printed: 6/22/2012



APPROXIMATE SCALES:

Horizontal:
1" = 250'

Vertical:
1" = 60'



Notes:

1. Location of Cross Section A-A' shown on Figure 4.
2. TCE concentrations in monitoring wells represent data collected by Nobis during Fall 2011 sampling event.
3. TCE concentrations in extraction wells represent data collected by the MassDEP GWTF O&M Contractor in October 2011.
4. Values with a "U" (i.e. 1.0 U) indicate that TCE was not detected at or above the concentration shown.
5. Source area "RW" wells not included in Fall 2010 sampling event. TCE Concentrations shown for source area "RW" series wells were collected during the ISTT Remedial Action Confirmation Sampling Event #3 (August 2011) [Nobis, 2011].
6. NS - Not Sampled.

Legend

10 — TCE Isoconcentration

Approximate Groundwater Elevation April 8, 2011.

12 — Well screened interval with TCE concentration depicted (µg/L).

Former ISTT Treatment Area

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FIGURE 8

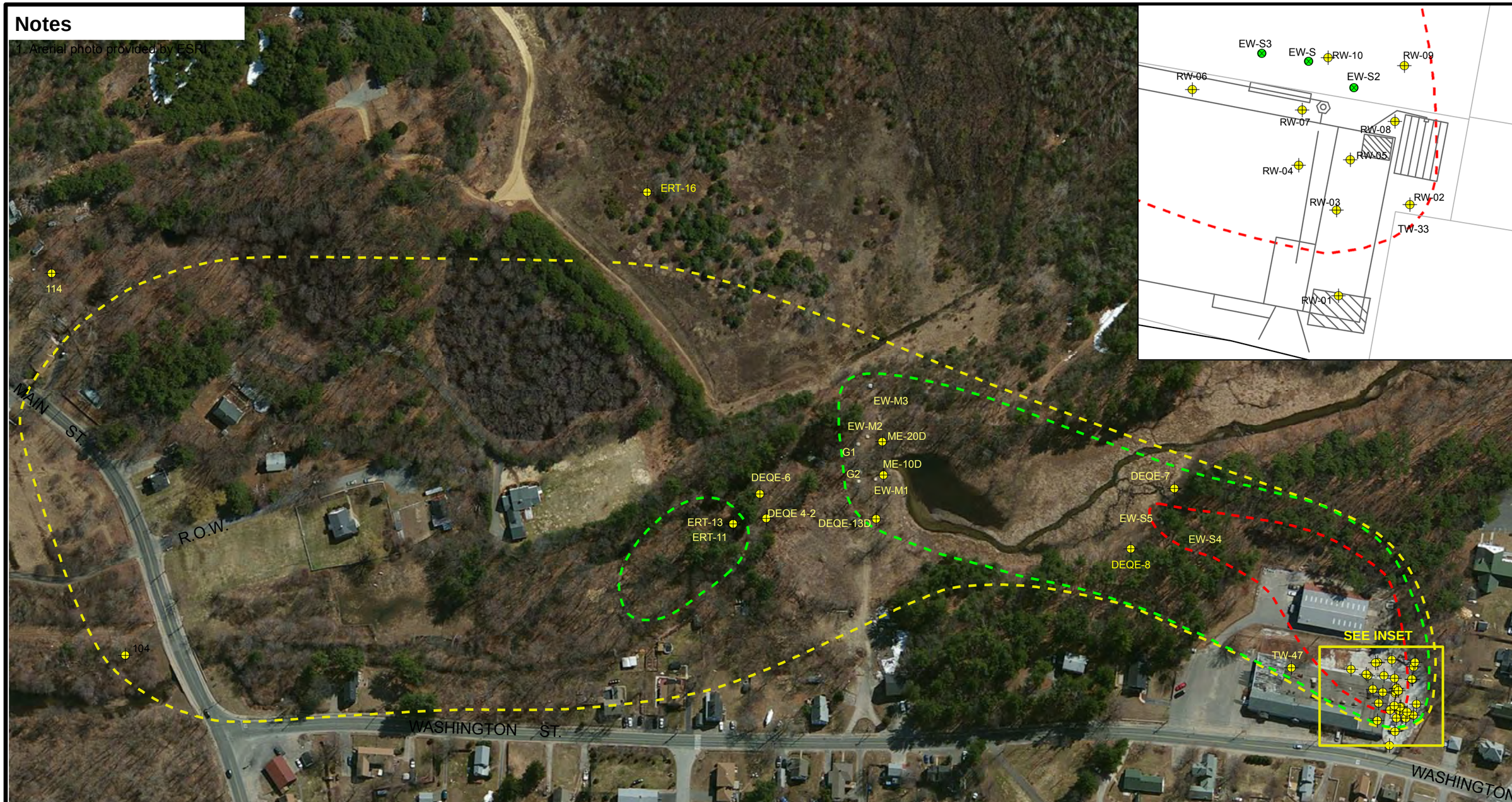
CROSS-SECTION A - A' &
TCE PLUME - FALL 2011
GROVELAND WELLS SUPERFUND SITE
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: JUNE 2012

Path: O:\Active\81000 SARS\81015.00 Groveland LTM\GIS\Fig_8_X_Section\AA'.mxd Date Printed: 6/15/2012

Notes

1. Aerial photo provided by ESRI



Legend

DEQE-8 — Overburden Monitoring Well

EW-M1 — Extraction Well

Extent of TCE Plume > 5µg/L Prior to System Startup in 2000

Extent of TCE Plume > 5µg/L in 2006

Extent of TCE Plume > 5µg/L in 2011

N

APPROXIMATE SCALE

180 90 0 180 Feet

INSET SCALE

50 25 0 50 Feet

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FIGURE 9

OVERBURDEN TCE PLUME
2000, 2006, AND 2011
GROVELAND WELLS
GROVELAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: DB
PROJECT NO. 81015	DATE: JUNE 2012

Path: O:\Active\81000 SARSS\81015.00 Groveland LTM\GIS\Fig_9_Overburden_TCE_Plume_AirPhoto.mxd\Fig_9_Overburden_TCE_Plume_AirPhoto.mxd Date Printed: 6/14/2012

APPENDIX A

Appendix A
Confirmation Groundwater Sampling Results -Trichloroethene[1]
Groveland Wells Superfund Site
Groveland, Massachusetts

Sample Location	Baseline Sampling		Confirmation Event No.1		Confirmation Event No.2		Confirmation Event No.3		TCE Mass Reduction[2]
	June, July, & August 2009		March 2011		May 2011		August 2011		
	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	
EW-S3	**28**		**36**		**15**		**38**		-36%
RW-01	5	U	5	U	5	U	5	U	-
RW-02	**15**		**1**	**J**	5	U	5	U	100%
RW-03	**11000**	**D**	**5.9**		**17**		**17**		100%
RW-04	**290**	**D**	**24**		**25**		**20**		93%
RW-05	**11000**	**D**	**37**		**15**		**78**		99%
RW-06	5	U	**1.2**	**J**	5	U	**8.9**		-
RW-07*	**83**		**28**		**9.6**		**11**		87%
RW-07B	**52**		**4.6**	**J**	**5.8**		**7.2**		86%
RW-08	**4**	**J**	**1.2**	**J**	5	U	5	U	100%
RW-09	**10**		**12**		5	U	5	U	100%
RW-10	**390**	**D**	**3.3**	**J**	**10**		**1.9**	**J**	100%
RW-10B	**1.4**	**J**	5	U	5	U	5	U	100%
TW-31	**8.7**	**B**	**130**		**83**		**38**		-337%
TW-40	5	U	5	U	5	U	5	U	-
TW-47	**8.3**	**B**	**2.3**	**J**	**1.3**	**J**	5	U	100%

Notes:

All values are in micrograms per liter (µg/L)

(1) Groundwater samples collected to evaluate the performance of the In Situ Thermal Treatment remedial action performed in the Site Source Area from August 2012 through February 2011.

(2) Mass reduction was calculated using baseline event and confirmation event no. 3. Zero was used for non-detect values.

Interim Site Cleanup Goal (CUG) for Trichloroethene = 5 µg/L, based on current Federal and State Maximum Contaminant Levels, per the Record of Decisions (1991).

* Well MPE-06 was used as a substitute for RW-07 during Confirmation Sampling Event No. 2 only because of a problem with well RW-07.

Bold - Detected Concentration

Shaded - Detected Concentrations Exceeds the CUG

TCE - Trichloroethene

Laboratory Qualifiers:

J - Quantitation is estimated as it is below the Sample-Specific Detection Limit (SSDL).

U - Not detected above the SSDL.

B - Analyte detected in laboratory blanks.

D - Concentration is reported from a dilution of the sample.

APPENDIX B

Appendix B-1

Groundwater Elevation Data - Spring 2011
Groveland Wells Superfund Site

Water Level Measurement Date: 8-Apr-11 **Water Level Measurement Personnel: J. Warrington**

Extraction Well Location	Associated Monitoring Well	Time	DTW (ft)	Water Table Elev (ft MSL)	Comments/ Depth to Bottom of Well (BOW)	Formation Screened	Screened Interval Depth (ft.)	Measuring Pt. Elevation (ft. msl)		Mass. Plane Coordinates Northing	Mass. Plane Coordinates Easting
GROVELAND MOM OPERABLE UNIT											
Sitewide	103	8:38	7.87	11.03	No lock or J-plug	BR	87-97	18.90	(b)	637,970.75	722,953.64
	104	8:39	8.32	10.78		Deep OB	43-53	19.10	(b)	637,973.03	722,959.83
	105	8:40	8.26	10.60		Shal. OB	12-22	18.86	(b)	637,976.66	722,951.92
	114	8:47	9.55	15.99		Deep OB	69-79	25.54	(b)	638,107.92	723,658.88
	P4	8:48	8.92	16.62		Shal. OB	9.5-19.5	25.54	(b)	638,106.42	723,654.36
	ERT-16	8:29	4.74	22.48		Deep OB	41-51	27.22	(b)	637,017.69	723,807.41
	108	8:23	17.29	20.02		BR	88-98	37.31	(b)	637,351.46	723,778.82
	109	8:16	5.17	17.36		BR	82-92	22.53	(b)	638,054.56	724,237.98
	No.3	8:14	7.64	15.69		Deep OB	58-63	23.33	(a)		
	110	8:06	8.07	13.87		Deep OB	45-55	21.94	(b)	638,538.65	724,545.99
	112	8:03	5.37	14.19		Deep OB	60-60	19.56	(b)	638,601.99	724,254.68
	NUS-4A	8:26	3.39	23.88		BR	85-105	27.27	(b)	637,015.33	723,803.30
EW-M1	EW-M1	10:00	45.06	(10.11)	EW-M1 On when water level measured	Deep OB	52-82	34.95	(a)	636,596	723,283
	ME-10S	9:53	14.11	22.24		Shal. OB	20-30	36.35	(b)	636584.9	723280.9
	ERT-11	9:36	4.98	17.93		Shal. OB	4-14	22.91	(b)	636,860	723,200
	ERT-13	9:37	5.36	17.23		Deep OB	39-49	22.59	(b)	636,860	723,200
	ERT-9	9:35	4.13	18.46		BR	59-69	22.59	(b)	636,889.17	723,145.00
	ME-10D	9:54	13.75	22.12		Deep OB	66-76	35.87	(b)	636,585	723,290
EW-M2	EW-M2	9:14	12.13	22.79	Extraction Well	Deep OB	51-76	34.92	(a)	636,610	723,363
	ME-20S	9:08	14.68	22.78		Shal. OB	19.9-29.9	37.46	(b)	636,586	723,356
	ME-20D	9:09	14.49	22.87		Deep OB	62.7-72.7	37.36	(b)	636,587	723,350
	DEQE-10	9:57	4.34	25.87		Shal. OB	0-8	30.21			
EW-M3	DEQE 9	9:04	15.66	24.17		Shal. OB	17-27	39.83	(a)	636,614	723,450
	GPW-4	8:58	17.01	22.82		Shal. OB	20-30	39.83	(b)	636,607	723,441
	GPW-01	9:49	16.79	22.36	1" PVC had no J-plug		38-48	39.15			
G1/G2**	G1	9:16	12.24	22.61	Extraction Well	Deep OB	45-63	34.85	(a)	636,631	723,348
	G2	10:03	12.96	22.49	Extraction Well	Deep OB	46.5-64.5	35.45	(a)	636,629	723,279
	DEQE 1-1	10:06	14.11	21.85		Shal. OB	8-23	35.96	(b)	636,649	723,276
	DEQE 4-1	----	----	----	Well too small for probe	Shal. OB	13-15	24.38	(b)	636,799.36	723,210.40
	DEQE 4-2	9:32	4.27	20.28		Shal. OB	39-49	24.55	(b)	636,799	723,210
	DEQE 5	9:12	13.01	23.07		Deep OB	55 - 65	36.08	(b)	636,619	723,356
	DEQE 6	9:29	4.49	20.36		Deep OB	45-55	24.85	(b)	636,811	723,255
	DEQE 11	9:24	3.36	21.50		Shal. OB	0-9	24.86	(b)	636,716	723,305
	DEQE 12	10:11	14.39	21.91		Shal. OB	14-24	36.30	(b)	636,640.31	723,213.32
	DEQE 13S	10:15	11.67	23.80		Shal. OB	25-35	35.47	(b)	636,595.92	723,213.93
	DEQE 13D	10:14	12.87	22.88		Deep OB	34-44	35.75	(b)	636,598.15	723,209.66
	ERT-1	10:20	15.05	22.12		Shal. OB	12-22	37.17	(b)	636,584	723,081
	No. 4	10:05	13.07	22.23		Deep OB	60 - 70	35.30	(a)	636,644	723,292

Appendix B-1

Groundwater Elevation Data - Spring 2011
Groveland Wells Superfund Site

GROVELAND SOURCE CONTROL OPERABLE UNIT											
Sitewide	TW-12	10:28	42.34	28.44		BR	44-54	70.78	(b)	635,899	723,115
	TW-24A	10:34	----	----		OB	33-43	81.80	(b)	635,678	723,117
	TW-24	10:33	47.78	33.62		BR	58-68	81.40	(b)	635,686	723,119
	TW-30	----	----	----	Abandoned	BR	47-55	75.93	(b)		
	TW-31	10:59	32.57	43.62		BR	40.5-48.5	76.19	(b)		
	RW-01	----	NM	NM	ISTR Area - Not Measured	Deep OB	30-40	79.05	(b)		
	RW-02	----	NM	NM	ISTR Area - Not Measured	Deep OB	41-51	77.90	(b)		
	RW-03	----	NM	NM	ISTR Area - Not Measured	Deep OB	30-40	79.43	(b)		
	RW-04	----	NM	NM	ISTR Area - Not Measured	Deep OB	29.5-39.5	79.78	(b)		
	RW-05	----	NM	NM	ISTR Area - Not Measured	Deep OB	36-46	79.50	(b)		
	RW-06	----	NM	NM	ISTR Area - Not Measured	Deep OB	26-36	76.21	(b)		
	RW-07	11:14	28.48	48.97	Water Temp caused probe malf.	Deep OB	35-45	77.45	(b)		
	RW-07B	----	NM	NM	ISTR Area - Not Measured	BR	80-100	76.31	(b)		
	RW-08	----	NM	NM	ISTR Area - Not Measured	Deep OB	39-49	76.86	(b)		
	RW-09	----	NM	NM	ISTR Area - Not Measured	Deep OB	29.5-39.5	75.43	(b)		
	RW-10	----	NM	NM	ISTR Area - Not Measured	Deep OB	29-39	74.52	(b)		
	RW-10B	----	NM	NM	ISTR Area - Not Measured	BR	55-75	73.91	(b)		
EW-S1	TW-1	----	----	----	Abandoned	OB	22-32	79.82	(a)	635,626	722,856
	EW-S1	11:03	28.66	42.99	Water Temp caused probe malf.	OB/BR	30.6-45.6	71.65	(a)	635,665	722,949
EW-S2	TW-3	----	----	----	Abandoned	OB	22-42	77.53	(a)	635,616	722,916
	TW-17	----	----	----	Abandoned	OB	35-45	79.01	(b)	635,649	722,918
	EW-S2	11:06	29.46	42.99	Water Temp caused probe malf.	OB/BR		72.45	(a)	635,640	722,935
EW-S3	TW-26A	----	----	----	Abandoned	OB	27-37	73.31	(b)	635,680	722,947
	TW-26	----	----	----	Abandoned	BR	48-58	73.13	(b)	635,684	722,946
	EW-S3	----	NM	NM	ISTR Area - Not Measured	OB/BR	30-46	71.91	(a)	635,691	722,954
EW-S4	DEQE 8	10:49	5.82	24.90		OB	8-13	30.72	(b)	636,132	723,154
	EW-S4	10:43	31.46	3.13	EW-S4 On when water level measured	BR	35-95	34.59	(a)	636,074	723,205
EW-S5	GPW-11	10:40	13.16	24.96		OB	13-23	38.12	(b)	636,045	723,197
	No. 5	10:37	14.62	25.29		OB	25-30	39.91	(a)	636,032	723,184
	DEQE 7	10:46	4.28	26.01		OB	18-28	30.29	(b)	636,052	723,265
	GPW-02	10:10	14.63	22.16			37-47	36.79	(b)		
	GPW-03	09:26	5.21	21.26			27-37	26.47	(b)		
	GPW-05	09:19	9.61	22.49			30-40	32.10	(b)		

NOTES:

ft. msl = feet above mean sea level
MOM = management of migration
NM = not measured
* indicates approximate depth of screened interval
(a) Measuring point is top of steel protective casing.
(b) Measuring point is top of PVC or stainless steel riser pipe.

Appendix B-2

Surface Water Elevation Data - Spring 2011
Groveland Wells Superfund Site

Water Level Measurement Date: **8-Apr-11** **Water Level Measurement Personnel: J. Warrington**

SURFACE WATER ELEVATION MONITORING STATIONS

Surface Water Gauge	Location	Time	Measurement	Surface Water Elev. (ft. msl)	Comments	Top of Gauge Elev. (ft. msl)	Surface Water Body	Mass. Plane Coordinates		
								Northing	Easting	Source
SG-4	Top of Mill Pond Dam	9:45	11.20	20.42	MP @ white mark @ east end of wing wall	31.62	Johnson Creek	636,580	723,320	ERT, 1985
SW-JC1	Dam outfall	9:22	6.06	20.41		26.47	Johnson Creek	636,696	723,323	M&E, 1999
SW-JC2	Near DEQE 6	Destroyed	----	----	Destroyed flooding 2010	21.09	Johnson Creek	636,815	723,283	M&E, 1999
SW-MP3	Near DEQE 8	Dry	----	----	Out of water	30.25	Mill Pond	636,110	723,187	M&E, 1999

NOTES: Table obtained from Metcalf & Eddy Specifications Section 01730.
ERT = ERT,1985. Appendix D: Locations and Elevations of Wells
M&E = M&E, 1999. Surveying data, January 1999.
ft. msl = feet above mean sea level

Appendix B-3

Groundwater Elevation Data - Fall 2011
Groveland Wells Superfund Site

Water Level Measurement Date: 17-Nov-11 **Water Level Measurement Personnel: A.Roy**

Extraction Well Location	Associated Monitoring Well	Time	DTW (ft)	Water Table Elev (ft MSL)	Comments/ Depth to Bottom of Well (BOW)	Formation Screened	Screened Interval Depth (ft.)	Measuring Pt. Elevation (ft. msl)		Mass. Plane Coordinates Northing	Mass. Plane Coordinates Easting
GROVELAND MOM OPERABLE UNIT											
Sitewide	103	1105	8.06	10.84	No lock or J-plug	BR	87-97	18.90	(b)	637,970.75	722,953.64
	104	1020	8.45	10.65		Deep OB	43-53	19.10	(b)	637,973.03	722,959.83
	105	----	NM	NM		Shal. OB	12-22	18.86	(b)	637,976.66	722,951.92
	114	1000	10.34	15.20		Deep OB	69-79	25.54	(b)	638,107.92	723,658.88
	P4	----	NM	NM		Shal. OB	9.5-19.5	25.54	(b)	638,106.42	723,654.36
	ERT-16	0945	5.16	22.06		Deep OB	41-51	27.22	(b)	637,017.69	723,807.41
	108	0920	18.23	19.08		BR	88-98	37.31	(b)	637,351.46	723,778.82
	109	0900	6.80	15.73		BR	82-92	22.53	(b)	638,054.56	724,237.98
	No.3	----	NM	NM		Deep OB	58-63	23.33	(a)		
	110	----	NM	NM		Deep OB	45-55	21.94	(b)	638,538.65	724,545.99
	112	----	NM	NM		Deep OB	60-60	19.56	(b)	638,601.99	724,254.68
	NUS-4A	0946	3.67	23.60		BR	85-105	27.27	(b)	637,015.33	723,803.30
	TW-49S	1130	6.70	14.71		Shal. OB	5-15	21.41	(b)	637112.501	723,074.77
	TW-49D	1132	6.62	14.82		Deep OB	45-55	21.44	(b)	637105.987	723,073.10
	TW-49R	1135	6.67	14.87		BR	90-100	21.54	(b)	637104.477	723,073.20
EW-M1	EW-M1	----	NM	NM	EW-M1 On when water level measured	Deep OB	52-82	34.95	(a)	636,596	723,283
	ME-10S	----	NM	NM		Shal. OB	20-30	36.35	(b)	636584.9	723280.9
	ERT-11	1200	6.43	16.48		Shal. OB	4-14	22.91	(b)	636,860	723,200
	ERT-13	1203	5.44	17.15		Deep OB	39-49	22.59	(b)	636,860	723,200
	ERT-9	1205	4.75	17.84		BR	59-69	22.59	(b)	636,889.17	723,145.00
	ME-10D	1340	13.04	22.83		Deep OB	66-76	35.87	(b)	636,585	723,290
EW-M2	EW-M2	----	NM	NM	Extraction Well	Deep OB	51-76	34.92	(a)	636,610	723,363
	ME-20S	----	NM	NM		Shal. OB	19.9-29.9	37.46	(b)	636,586	723,356
	ME-20D	1330	13.63	23.73		Deep OB	62.7-72.7	37.36	(b)	636,587	723,350
	DEQE-10	----	NM	NM		Shal. OB	0-8	30.21		636,574.38	723,280.99
EW-M3	DEQE 9	----	NM	NM		Shal. OB	17-27	39.83	(a)	636,614	723,450
	GPW-4	----	NM	NM		Shal. OB	20-30	39.83	(b)	636,607	723,441
	GPW-01	----	NM	NM	1" PVC had no J-plug		38-48	39.15		636,593.11	723,285.76
G1/G2**	G1	----	NM	NM	Extraction Well	Deep OB	45-63	34.85	(a)	636,631	723,348
	G2	----	NM	NM	Extraction Well	Deep OB	46.5-64.5	35.45	(a)	636,629	723,279
	DEQE 1-1	----	NM	NM		Shal. OB	8-23	35.96	(b)	636,649	723,276
	DEQE 4-1	----	NM	NM	Well too small for probe	Shal. OB	13-15	24.38	(b)	636,799.36	723,210.40
	DEQE 4-2	1310	4.34	20.21		Shal. OB	39-49	24.55	(b)	636,799	723,210
	DEQE 5	----	NM	NM		Deep OB	55 - 65	36.08	(b)	636,619	723,356
	DEQE 6	1320	4.48	20.37		Deep OB	45-55	24.85	(b)	636,811	723,255
	DEQE 11	----	NM	NM		Shal. OB	0-9	24.86	(b)	636,716	723,305
	DEQE 12	----	NM	NM		Shal. OB	14-24	36.30	(b)	636,640.31	723,213.32
	DEQE 13S	----	NM	NM		Shal. OB	25-35	35.47	(b)	636,595.92	723,213.93
	DEQE 13D	1350	12.16	23.59		BR	34-44	35.75	(b)	636,598.15	723,209.66
	ERT-1	----	NM	NM		Shal. OB	12-22	37.17	(b)	636,584	723,081
	No. 4	----	NM	NM		Deep OB	60 - 70	35.30	(a)	636,644	723,292

Appendix B-3

Groundwater Elevation Data - Fall 2011
Groveland Wells Superfund Site

GROVELAND SOURCE CONTROL OPERABLE UNIT											
Sitewide	TW-12	1430	43.18	27.60		BR	44-54	70.78	(b)	635,899	723,115
	TW-24A		----	----		OB	33-43	81.80	(b)	635,678	723,117
	TW-24	1435	47.90	33.50		BR	58-68	81.40	(b)	635,686	723,119
	TW-30	----	----	----	Abandoned	BR	47-55	75.93	(b)	635,614.03	722,938.25
	TW-31	1450	33.51	42.68		BR	40.5-48.5	76.19	(b)	635,653.77	722,968.96
	RW-01	----	NM	NM	ISTR Area - Not Measured	Deep OB	30-40	79.05	(b)	635,648.31	722,819.98
	RW-02	----	NM	NM	ISTR Area - Not Measured	Deep OB	41-51	77.90	(b)	635,609.05	722,870.42
	RW-03	----	NM	NM	ISTR Area - Not Measured	Deep OB	30-40	79.43	(b)	635,649.37	722,867.22
	RW-04	----	NM	NM	ISTR Area - Not Measured	Deep OB	29.5-39.5	79.78	(b)	635,670.36	722,892.16
	RW-05	----	NM	NM	ISTR Area - Not Measured	Deep OB	36-46	79.50	(b)	635,641.91	722,895.16
	RW-06	----	NM	NM	ISTR Area - Not Measured	Deep OB	26-36	76.21	(b)	635,729.17	722,933.80
	RW-07	----		-	Water Temp caused probe malf.	Deep OB	35-45	77.45	(b)	635,668.51	722,922.55
	RW-07B	----	NM	NM	ISTR Area - Not Measured	BR	80-100	76.31	(b)	635,671.57	722,926.25
	RW-08	----	NM	NM	ISTR Area - Not Measured	Deep OB	39-49	76.86	(b)	635,617.26	722,916.15
	RW-09	----	NM	NM	ISTR Area - Not Measured	Deep OB	29.5-39.5	75.43	(b)	635,611.93	722,947.24
	RW-10	----	NM	NM	ISTR Area - Not Measured	Deep OB	29-39	74.52	(b)	635,654.21	722,951.43
	RW-10B	----	NM	NM	ISTR Area - Not Measured	BR	55-75	73.91	(b)	635,651.80	722,947.43
EW-S1	TW-1	----	----	----	Abandoned	OB	22-32	79.82	(a)	635,626	722,856
	EW-S1	----	NM	NM	Water Temp caused probe malf.	OB/BR	30.6-45.6	71.65	(a)	635,665	722,949
EW-S2	TW-3	----	----	----	Abandoned	OB	22-42	77.53	(a)	635,616	722,916
	TW-17	----	----	----	Abandoned	OB	35-45	79.01	(b)	635,649	722,918
	EW-S2	----		-	Water Temp caused probe malf.	OB/BR		72.45	(a)	635,640	722,935
EW-S3	TW-26A	----	----	----	Abandoned	OB	27-37	73.31	(b)	635,680	722,947
	TW-26	----	----	----	Abandoned	BR	48-58	73.13	(b)	635,684	722,946
	EW-S3	----	NM	NM	ISTR Area - Not Measured	OB/BR	30-46	71.91	(a)	635,691	722,954
EW-S4	DEQE 8	1425	3.43	27.29		OB	8-13	30.72	(b)	636,132	723,154
	EW-S4	----	NM	NM	EW-S4 On when water level measured	BR	35-95	34.59	(a)	636,074	723,205
EW-S5	GPW-11	----	NM	NM		OB	13-23	38.12	(b)	636,045	723,197
	No. 5	----	NM	NM		OB	25-30	39.91	(a)	636,032	723,184
	DEQE 7	1420	3.35	26.94		OB	18-28	30.29	(b)	636,052	723,265
	GPW-02	----	NM	NM			37-47	36.79	(b)	636,663.09	723,271.45
	GPW-03	----	NM	NM			27-37	26.47	(b)	636,739.52	723,275.48
	GPW-05	----	NM	NM			30-40	32.10	(b)	636,668.93	723,375.69

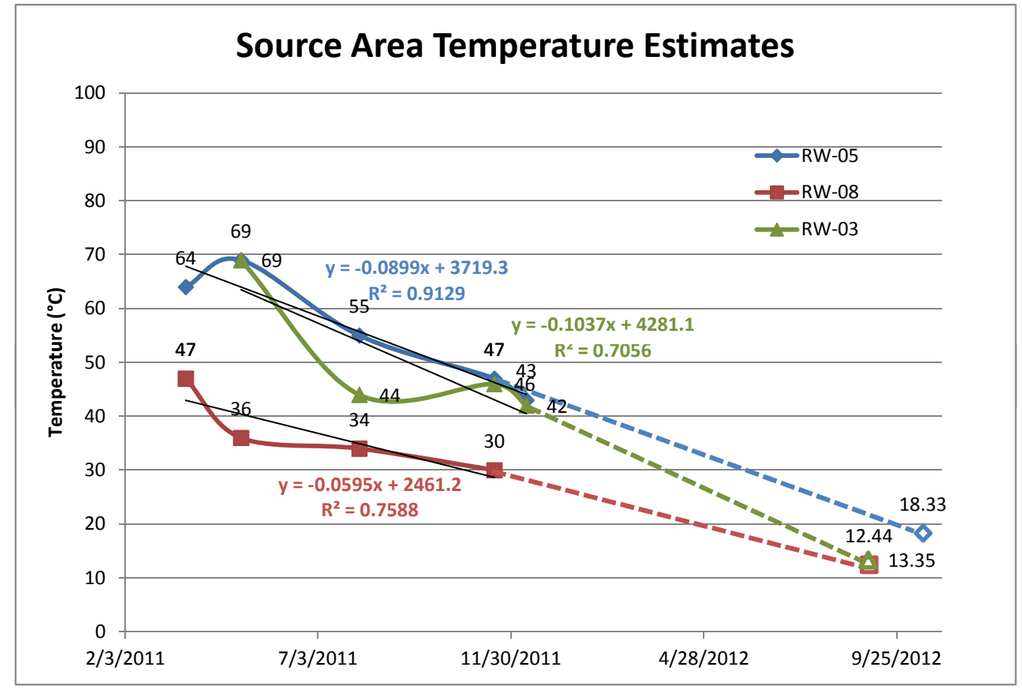
NOTES:

ft. msl = feet above mean sea level
MOM = management of migration
NM = not measured
* indicates approximate depth of screened interval
(a) Measuring point is top of steel protective casing.
(b) Measuring point is top of PVC or stainless steel riser pipe.

APPENDIX C

Appendix C
Source Area Temperature Evaluation
Groveland Wells Superfund Site

Well ID	Temperature Data (°C)						
	Baseline[1]	Shutdown[2]	Confirmation #1[3]	Confirmation #2[3]	Confirmation #3[3]	MassDEP Initial[4]	
	8/25/2009	2/3/2011	3/22/2011	5/4/2011	8/4/2011	11/17/2011	12/12/2011
EW-S1	NA	*100*	NA	NA	NA	46	46
EW-S2	NA	*100*	NA	NA	NA	45	41
EW-S3	NA	*100*	45	48	NA	34	31
MPE-06	NA	*100*	NA	61	NA	NA	NA
RW-01	14.04	*100*	NA	38	31	NA	NA
RW-02	13.53	*100*	34	29	29	NA	NA
RW-03	13.35	*100*	NA	69	44	46	42
RW-04	12.89	*100*	58	52	36	NA	NA
RW-05	18.33	*100*	64	69	55	47	43
RW-06	12.27	*100*	NA	30	NA	NA	NA
RW-07	17.63	*100*	25	NA	50	NA	NA
RW-07B	13.47	*100*	NA	52	NA	NA	NA
RW-08	12.44	*100*	47	36	34	30	NA
RW-09	11.74	*100*	NA	39	24	NA	NA
RW-10	13.94	*100*	64	55	45	NA	NA
RW-10B	14.27	*100*	47	53	43	NA	NA
TW-31	12.14	NA	20	29	NA	NA	NA
TW-40	11.07	NA	12	17	19	NA	NA
TW-47	12.42	NA	10	NA	15	NA	NA



Notes:

NA - Not Available
(1) Data collected at time of sample collection after low-flow groundwater purging was completed.
(2) Data presented is assumed at the time of ISTT shutdown in the saturated zone.
(3) Data collected at the beginning of low-flow groundwater purging efforts.
(4) Data collected using a discrete bailer sample.

30C= 86F
47C= 117F

Target temperatures:
To resume pumping from source area extraction wells: 100 °F (37.9 °C)
To reach ambient groundwater temperature: approx. 55 °F (12.8 °C)

Statistics:

Original Estimate 11-30-2011

RW-05	y = -0.0849x + 3516	RW-08	y = -0.0595x + 2461.2
	R^2 = 0.8602		R^2 = 0.7588
Y=	18.33	Y=	12.44
X=	10/15/2012	X=	9/3/2012

Revised Estimate 12-15-2011

RW-05	y = -0.0899x + 3719.3	RW-03	y = -0.1037x + 4281.1
	R^2 = 0.9129		R^2 = 0.7056
Y=	18.33	Y=	13.35
X=	9/15/2012	X=	9/2/2012

APPENDIX D

Appendix D
Summary of Groundwater Analytical Results - Spring 2011, Low / Medium Level VOCs
Groveland Wells Superfund Site

	Sample Location	TW-12	TW-24	TW-24
	Station ID	OU1-GW-TW12-040511	OU1-GW-DUP01-040511	OU2-GW-TW24-040511
	Sample Date	4/5/2011 2:05:00 PM	4/5/2011 2:15:00 PM	4/5/2011 2:10:00 PM
	Units	ug/L	ug/L	ug/L
Chemical	CAS Number			
1,1,1-Trichloroethane	71-55-6	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	79-34-5	5 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5 U	5 U	5 U
1,1,2-Trichloroethane	79-00-5	5 U	5 U	5 U
1,1-Dichloroethane	75-34-3	5 U	5 U	5 U
1,1-Dichloroethene	75-35-4	5 U	5 U	5 U
1,2,3-Trichlorobenzene	87-61-6	5 U	5 U	5 U
1,2,4-Trichlorobenzene	120-82-1	5 U	5 U	5 U
1,2-Dibromo-3-Chloropropane	96-12-8	5 U	5 U	5 U
1,2-Dibromoethane	106-93-4	5 U	5 U	5 U
1,2-Dichlorobenzene	95-50-1	5 U	5 U	5 U
1,2-Dichloroethane	107-06-2	5 U	5 U	5 U
1,2-Dichloropropane	78-87-5	5 U	5 U	5 U
1,3-Dichlorobenzene	541-73-1	5 U	5 U	5 U
1,4-Dichlorobenzene	106-46-7	5 U	5 U	5 U
1,4-Dioxane	123-91-1	100 U	100 U	100 U
2-Butanone	78-93-3	10 U	10 U	10 U
2-Hexanone	591-78-6	10 U	10 U	10 U
4-Methyl-2-Pentanone	108-10-1	10 U	10 U	10 U
Acetone	67-64-1	16 B	11 B	11 B
Benzene	71-43-2	5 U	5 U	5 U
Bromochloromethane	74-97-5	5 U	5 U	5 U
Bromodichloromethane	75-27-4	5 U	5 U	5 U
Bromoform	75-25-2	5 U	5 U	5 U
Bromomethane	74-83-9	5 U	5 U	5 U
Carbon Disulfide	75-15-0	5 U	5 U	5 U
Carbon Tetrachloride	56-23-5	5 U	5 U	5 U
Chlorobenzene	108-90-7	5 U	5 U	5 U
Chloroethane	75-00-3	5 U	5 U	5 U
Chloroform	67-66-3	5 U	5 U	5 U
Chloromethane	74-87-3	5 U	5 U	5 U
cis-1,2-Dichloroethene	156-59-2	3.2 J	0.57 J	0.51 J
cis-1,3-Dichloropropene	10061-01-5	5 U	5 U	5 U
Cyclohexane	110-82-7	1.6 JB	1.7 JB	1.6 JB
Dibromochloromethane	124-48-1	5 U	5 U	5 U
Dichlorodifluoromethane	75-71-8	5 U	5 U	5 U
Ethylbenzene	100-41-4	5 U	5 U	5 U
Isopropylbenzene	98-82-8	5 U	5 U	5 U
m,p-Xylene	179601-23-1	5 U	5 U	5 U
Methyl Acetate	79-20-9	5 U	5 U	5 U
Methyl Tert-Butyl Ether	1634-04-4	5 U	5 U	5 U
Methylcyclohexane	108-87-2	5 U	5 U	5 U
Methylene Chloride	75-09-2	1.7 JB	1.8 JB	1.7 JB
o-Xylene	95-47-6	5 U	5 U	5 U
Styrene	100-42-5	5 U	5 U	5 U
Tetrachloroethene	127-18-4	5 U	5 U	5 U
Toluene	108-88-3	5 U	5 U	5 U
trans-1,2-Dichloroethene	156-60-5	5 U	5 U	5 U
trans-1,3-Dichloropropene	10061-02-6	5 U	5 U	5 U
Trichloroethene	79-01-6	26	19	19
Trichlorofluoromethane	75-69-4	5 U	5 U	5 U
Vinyl Chloride	75-01-4	5 U	5 U	5 U

Appendix D
Summary of Groundwater Analytical Results - Spring 2011, Trace VOCs
Groveland Wells Superfund Site

	Sample Location	103	108	114	DEQE13-D	DEQE4-2	DEQE-6	DEQE-7	DEQE-8	ERT-11
	Station ID	OU1-GW-103-040511	OU2-GW-108-040511	OU1-GW-114-040511	OU1-GW-DEQE13D-040511	OU1-GW-DEQE4-2-040511	OU1-GW-DEQE6-040511	OU1-GW-DEQE7-040511	OU1-GW-DEQE8-040511	OU1-GW-ERT11-040511
	Sample Date	4/5/2011 11:06:00 AM	4/5/2011 10:08:00 AM	4/5/2011 10:45:00 AM	4/5/2011 12:20:00 PM	4/5/2011 12:50:00 PM	4/5/2011 12:42:00 PM	4/5/2011 2:35:00 PM	4/5/2011 3:19:00 PM	4/5/2011 12:55:00 PM
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chemical	CAS Number									
1,1,1-Trichloroethane	71-55-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	79-00-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	75-34-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	75-35-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	120-82-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	106-93-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	95-50-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	107-06-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	78-87-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	541-73-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	106-46-7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	78-93-3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	591-78-6	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	108-10-1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	67-64-1	9.8	11	10	10	12	9.7	10	12	11
Benzene	71-43-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	74-97-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	75-27-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	75-25-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	74-83-9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	75-15-0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	56-23-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	108-90-7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	75-00-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	67-66-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	74-87-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	156-59-2	16	0.68	1	0.5 U	0.61	0.81	0.5 U	0.31 J	0.5 U
cis-1,3-Dichloropropene	10061-01-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	110-82-7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	124-48-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	75-71-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	100-41-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	98-82-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	179601-23-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Acetate	79-20-9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Tert-Butyl Ether	1634-04-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	108-87-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	75-09-2	0.5 U	0.25 JB	0.19 JB	0.22 JB	0.5 U	0.25 JB	0.2 JB	0.21 JB	0.2 JB
o-Xylene	95-47-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	100-42-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	127-18-4	0.58	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	108-88-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	156-60-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	10061-02-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	79-01-6	1.6	1.5	0.5 U	0.5 U	1.3	3.6	0.5 U	0.24 J	0.5 U
Trichlorofluoromethane	75-69-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	75-01-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Appendix D
Summary of Groundwater Analytical Results - Spring 2011, Trace VOCs
Groveland Wells Superfund Site

	Sample Location	ERT-13	ERT-16	ERT-9	ERT-9	ME10D	NUS-4A	TW-49D	TW-49R	TW-49S
	Station ID	OU1-GW-ERT13-040511	OU1-GW-ERT16-040511	OU1-GW-DUP02-040511	OU1-GW-ERT9-040511	OU1-GW-ME10D-040511	OU1-GW-NUS4A-040511	OU1-GW-TW49D-040611	OU1-GW-TW49R-040611	OU1-GW-TW49S-040611
	Sample Date	4/5/2011 12:59:00 PM	4/5/2011 9:41:00 AM	4/5/2011 1:03:00 PM	4/5/2011 1:00:00 PM	4/5/2011 12:30:00 PM	4/5/2011 9:45:00 AM	4/6/2011 12:55:00 PM	4/6/2011 3:15:00 PM	4/6/2011 11:25:00 AM
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chemical	CAS Number									
1,1,1-Trichloroethane	71-55-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	79-00-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	75-34-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	75-35-4	0.5 U	0.5 U	0.53	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	120-82-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	106-93-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	95-50-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	107-06-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	78-87-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	541-73-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	106-46-7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	78-93-3	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	591-78-6	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	108-10-1	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	67-64-1	11	11	12	12	11	9.9	5 U	6.6 B	5 U
Benzene	71-43-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	74-97-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	75-27-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	75-25-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	74-83-9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	75-15-0	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 J	0.5 U	0.23 J	0.5 U
Carbon Tetrachloride	56-23-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	108-90-7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	75-00-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	67-66-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4.6	0.5 U
Chloromethane	74-87-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	156-59-2	0.5 U	0.29 J	91 D	84 D	0.33 J	0.5 U	0.5 U	4.5	0.5 U
cis-1,3-Dichloropropene	10061-01-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cyclohexane	110-82-7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	124-48-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	75-71-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	100-41-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	98-82-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	179601-23-1	0.5 U	0.5 U	0.11 J	0.5 U	0.5 U	0.5 U	0.5 U	0.15 J	0.5 U
Methyl Acetate	79-20-9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1	0.5 U
Methyl Tert-Butyl Ether	1634-04-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	108-87-2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene Chloride	75-09-2	0.28 JB	0.32 JB	0.26 JB	0.22 JB	0.23 JB	0.25 JB	0.5 U	0.23 J	0.26 JB
o-Xylene	95-47-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	100-42-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	127-18-4	0.11 J	0.5 U	0.19 J	0.5 U	0.15 J	0.13 J	0.5 U	0.5 U	0.085 J
Toluene	108-88-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.2	0.5 U
trans-1,2-Dichloroethene	156-60-5	0.5 U	0.5 U	0.53	0.42 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	10061-02-6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	79-01-6	0.67	0.45 J	7	6.7	0.27 J	0.25 J	0.5 U	0.71	0.5 U
Trichlorofluoromethane	75-69-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	75-01-4	0.5 U	0.5 U	2.6	2.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Appendix D
Summary of Groundwater Analytical Results - Fall 2011
Groveland Wells Superfund Site

	Sample Location	103	104	108	109	114	DEQE13-D	DEQE4-2	DEQE-6	DEQE-7	DEQE-8	ERT-11	ERT-13	ERT-16	ER
	Station ID	103-12092011	104-12092011	108-12092011	109-12092011	114-12092011	DEQE-13D-12092011	DEQE-4-2-12092011	DEQE-6-12092011	DEQE-7-12092011	DEQE-8-12092011	ERT-11-12092011	ERT-13-12092011	ERT-16-12092011	DUP-01-
	Sample Date	12/9/2011 9:55:00 AM	12/9/2011 10:00:00 AM	12/9/2011 9:15:00 AM	12/9/2011 8:45:00 AM	12/9/2011 9:50:00 AM	12/9/2011 1:25:00 PM	12/9/2011 12:08:00 PM	12/9/2011 12:15:00 PM	12/9/2011 1:50:00 PM	12/9/2011 1:42:00 PM	12/9/2011 11:50:00 AM	12/9/2011 12:00:00 PM	12/9/2011 9:30:00 AM	12/9/2011 1
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug
Chemical	CAS Number														
1,1,1,2-Tetrachloroethane	630-20-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,1,1-Trichloroethane	71-55-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,1,2,2-Tetrachloroethane	79-34-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1,2-Trichloroethane	79-00-5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,1-Dichloroethane	75-34-3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,1-Dichloroethene	75-35-4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,1-Dichloropropene	563-58-6	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
1,2,3-Trichlorobenzene	87-61-6	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
1,2,3-Trichloropropane	96-18-4	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
1,2,4-Trichlorobenzene	120-82-1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,2,4-Trimethylbenzene	95-63-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,2-Dibromo-3-Chloropropane	96-12-8	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
1,2-Dibromoethane	106-93-4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,2-Dichlorobenzene	95-50-1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,2-Dichloroethane	107-06-2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,2-Dichloropropane	78-87-5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,3,5-Trimethylbenzene	108-67-8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,3-Dichlorobenzene	541-73-1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,3-Dichloropropane	142-28-9	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,4-Dichlorobenzene	106-46-7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
1,4-Dioxane	123-91-1	100 U	100 U	100 U	100 U	100 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	100 U	50
2,2-Dichloropropane	594-20-7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
2-Butanone	78-93-3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10
2-Chlorotoluene	95-49-8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
2-Hexanone	591-78-6	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10
2-Methyl-2-phenylpropane	98-06-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
2-Phenylbutane	135-98-8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
4-Chlorotoluene	106-43-4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
4-Methyl-2-Pentanone	108-10-1	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10
Acetone	67-64-1	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10
Benzene	71-43-2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Bromobenzene	108-86-1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Bromochloromethane	74-97-5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Bromodichloromethane	75-27-4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Bromoform	75-25-2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Bromomethane	74-83-9	2 U	2 U	2 U	2 U	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 U	2
Butane, 2-Methoxy-2-Methyl-	994-05-8	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
Carbon Disulfide	75-15-0	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Carbon Tetrachloride	56-23-5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Chlorobenzene	108-90-7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Chloroethane	75-00-3	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
Chloroform	67-66-3	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
Chloromethane	74-87-3	2 U	2 U	2 U	2 U	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 U	2
cis-1,2-Dichloroethene	156-59-2	14	12	1 U	1 U	1.5	1 U	1 U	1.3	1 U	1 U	1 U	1 U	2.3	100
cis-1,3-Dichloropropene	10061-01-5	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4
Cymene	99-87-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Dibromochloromethane	124-48-1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
Dibromomethane	74-95-3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Dichlorodifluoromethane	75-71-8	2 U	2 U	2 U	2 U	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 U	2
Diethyl ether	60-29-7	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
Diisopropyl Ether	108-20-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
Ethylbenzene	100-41-4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Hexachlorobutadiene	87-68-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
Isopropylbenzene	98-82-8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
m,p-Xylene	179601-23-1	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
Methyl Tert-Butyl Ether	1634-04-4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Methylene Chloride	75-09-2	5 U	5 U	5 U	5 U	5 U	5 UL	5 U	5 U	5 UL	5 UL	5 U	5 U	5 U	5
Naphthalene	91-20-3	5 U	5 U	5 U	5 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	5 U	2
n-Butylbenzene	104-51-8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
n-Propylbenzene	103-65-1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
o-Xylene	95-47-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Styrene	100-42-5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Tert-butyl ethyl ether	637-92-3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
Tetrachloroethene	127-18-4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Tetrahydrofuran	109-99-9	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
Toluene	108-88-3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
trans-1,2-Dichloroethene	156-60-5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
trans-1,3-Dichloropropene	10061-02-6	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4
Trichloroethene	79-01-6	2.1	1 U	2.2	1 U	1 U	1 U	1.6	3.3	1 U	1 U	1 U	1 U	3.1	6.1
Trichlorofluoromethane	75-69-4	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2
Vinyl Chloride	75-01-4	2 U	2 U	2 U	2 U	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 U	5

Appendix D
Summary of Groundwater Analytical Results - Fall 2011
Groveland Wells Superfund Site

	Sample Location	T-9	ERT-9	ME-10D	ME-20D	NUS-4A	TW-12	TW-24	TW-24	TW-31	TW-49D	TW-49D	TW-49D	TW-49D	TW-49R
	Station ID	2092011	ERT-09-12092011	ME-10D-12092011	ME-20D-12092011	NVS-4A-12092011	TW-12-12092011	DUP-02-12092011	TW-24-12092011	TW-31-12092011	TW-49D-1-12092011	TW-49D-2-12092011	TW-49D-3-12092011	TW-49D-4-12092011	TW-49R-1-12092011
	Sample Date	1:47:00 AM	12/9/2011 11:43:00 AM	12/9/2011 1:20:00 PM	12/9/2011 1:15:00 PM	12/9/2011 9:25:00 AM	12/9/2011 2:05:00 PM	12/9/2011 2:00:00 PM	12/9/2011 2:00:00 PM	12/9/2011 2:10:00 PM	12/9/2011 11:08:00 AM	12/9/2011 11:12:00 AM	12/9/2011 11:14:00 AM	12/9/2011 11:16:00 AM	12/9/2011 10:55:00 AM
	Units	/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chemical	CAS Number														
1,1,1,2-Tetrachloroethane	630-20-6	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1,1-Trichloroethane	71-55-6	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1,2,2-Tetrachloroethane	79-34-5	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
1,1,2-Trichloroethane	79-00-5	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1-Dichloroethane	75-34-3	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1-Dichloroethene	75-35-4	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1-Dichloropropene	563-58-6	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
1,2,3-Trichlorobenzene	87-61-6	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
1,2,3-Trichloropropane	96-18-4	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
1,2,4-Trichlorobenzene	120-82-1	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2,4-Trimethylbenzene	95-63-6	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2-Dibromo-3-Chloropropane	96-12-8	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
1,2-Dibromoethane	106-93-4	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
1,2-Dichlorobenzene	95-50-1	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2-Dichloroethane	107-06-2	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2-Dichloropropane	78-87-5	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,3,5-Trimethylbenzene	108-67-8	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,3-Dichlorobenzene	541-73-1	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,3-Dichloropropane	142-28-9	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
1,4-Dichlorobenzene	106-46-7	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
1,4-Dioxane	123-91-1	U	50 U	50 U	50 U	100 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	100 U
2,2-Dichloropropane	594-20-7	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
2-Butanone	78-93-3	U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U
2-Chlorotoluene	95-49-8	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
2-Hexanone	591-78-6	U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U
2-Methyl-2-phenylpropane	98-06-6	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
2-Phenylbutane	135-98-8	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
4-Chlorotoluene	106-43-4	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
4-Methyl-2-Pentanone	108-10-1	U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U
Acetone	67-64-1	U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	20 U
Benzene	71-43-2	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromobenzene	108-86-1	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromochloromethane	74-97-5	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromodichloromethane	75-27-4	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromoform	75-25-2	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromomethane	74-83-9	UL	2 UL	2 UL	2 UL	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	4 UL
Butane, 2-Methoxy-2-Methyl-	994-05-8	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Carbon Disulfide	75-15-0	U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U
Carbon Tetrachloride	56-23-5	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Chlorobenzene	108-90-7	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Chloroethane	75-00-3	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
Chloroform	67-66-3	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
Chloromethane	74-87-3	UL	2 UL	2 UL	2 UL	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	4 UL
cis-1,2-Dichloroethene	156-59-2		94	1 U	1 U	1 U	3.6	1 U	1 U	1.3	1 U	1 U	1 U	1 U	3.2
cis-1,3-Dichloropropene	10061-01-5	U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.8 U
Cymene	99-87-6	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Dibromochloromethane	124-48-1	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Dibromomethane	74-95-3	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Dichlorodifluoromethane	75-71-8	UL	2 UL	2 UL	2 UL	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	4 UL
Diethyl ether	60-29-7	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
Diisopropyl Ether	108-20-3	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Ethylbenzene	100-41-4	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Hexachlorobutadiene	87-68-3	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Isopropylbenzene	98-82-8	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
m,p-Xylene	179601-23-1	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
Methyl Tert-Butyl Ether	1634-04-4	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Methylene Chloride	75-09-2	U	5 U	5 UL	5 UL	5 U	5 UL	5 UL	5 UL	5 UL	5 U	5 U	5 U	5 U	10 U
Naphthalene	91-20-3	U	2 U	2 U	2 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
n-Butylbenzene	104-51-8	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
n-Propylbenzene	103-65-1	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
o-Xylene	95-47-6	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Styrene	100-42-5	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Tert-butyl ethyl ether	637-92-3	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Tetrachloroethene	127-18-4	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
Tetrahydrofuran	109-99-9	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
Toluene	108-88-3	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
trans-1,2-Dichloroethene	156-60-5	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U
trans-1,3-Dichloropropene	10061-02-6	U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.8 U
Trichloroethene	79-01-6		5.7	1 U	1 U	1 U	30	17	17	13	1 U	1 U	1 U	1 U	2 U
Trichlorofluoromethane	75-69-4	U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U
Vinyl Chloride	75-01-4	L	4 L	2 UL	2 UL	2 U	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	2 UL	4 UL

Appendix D
Summary of Groundwater Analytical Results - Fall 2011
Groveland Wells Superfund Site

	Sample Location	TW-49R	TW-49R	TW-49R	TW-49S	TW-49S	TW-49S	TW-49S
	Station ID	TW-49R-2-12092011	TW-49R-3-12092011	TW-49R-4-12092011	TW-49S-1-12092011	TW-49S-2-12092011	TW-49S-3-12092011	TW-49S-4-12092011
	Sample Date	12/9/2011 11:00:00 AM	12/9/2011 11:05:00 AM	12/9/2011 11:10:00 AM	12/9/2011 11:20:00 AM	12/9/2011 11:25:00 AM	12/9/2011 11:28:00 AM	12/9/2011 11:32:00 AM
	Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chemical	CAS Number							
1,1,1,2-Tetrachloroethane	630-20-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	71-55-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	79-00-5	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	563-58-6	4 U	4 U	4 U	2 U	2 U	2 U	2 U
1,2,3-Trichlorobenzene	87-61-6	4 U	4 U	4 U	2 U	2 U	2 U	2 U
1,2,3-Trichloropropane	96-18-4	4 U	4 U	4 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	120-82-1	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	95-63-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	96-12-8	4 U	4 U	4 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	106-93-4	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	95-50-1	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	107-06-2	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	78-87-5	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	541-73-1	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	142-28-9	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	106-46-7	2 U	2 U	2 U	1 U	1 U	1 U	1 U
1,4-Dioxane	123-91-1	100 U	100 U	100 U	50 U	50 U	50 U	50 U
2,2-Dichloropropane	594-20-7	2 U	2 U	2 U	1 U	1 U	1 U	1 U
2-Butanone	78-93-3	20 U	20 U	20 U	10 U	10 U	10 U	10 U
2-Chlorotoluene	95-49-8	2 U	2 U	2 U	1 U	1 U	1 U	1 U
2-Hexanone	591-78-6	20 U	20 U	20 U	10 U	10 U	10 U	10 U
2-Methyl-2-phenylpropane	98-06-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
2-Phenylbutane	135-98-8	2 U	2 U	2 U	1 U	1 U	1 U	1 U
4-Chlorotoluene	106-43-4	2 U	2 U	2 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone	108-10-1	20 U	20 U	20 U	10 U	10 U	10 U	10 U
Acetone	67-64-1	20 U	20 U	20 U	10 U	10 U	10 U	10 U
Benzene	71-43-2	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Bromobenzene	108-86-1	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Bromochloromethane	74-97-5	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Bromodichloromethane	75-27-4	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Bromoform	75-25-2	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	4 UL	4 UL	4 UL	2 UL	2 UL	2 UL	2 UL
Butane, 2-Methoxy-2-Methyl-	994-05-8	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Disulfide	75-15-0	10 U	10 U	10 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	56-23-5	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Chloroethane	75-00-3	4 U	4 U	4 U	2 U	2 U	2 U	2 U
Chloroform	67-66-3	4 U	4 U	4 U	2 U	2 U	2 U	2 U
Chloromethane	74-87-3	4 UL	4 UL	4 UL	2 UL	2 UL	2 UL	2 UL
cis-1,2-Dichloroethene	156-59-2	3.4	3.4	3.5	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	10061-01-5	0.8 U	0.8 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U
Cymene	99-87-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Dibromochloromethane	124-48-1	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	74-95-3	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	75-71-8	4 UL	4 UL	4 UL	2 UL	2 UL	2 UL	2 UL
Diethyl ether	60-29-7	4 U	4 U	4 U	2 U	2 U	2 U	2 U
Diisopropyl Ether	108-20-3	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	100-41-4	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	98-82-8	2 U	2 U	2 U	1 U	1 U	1 U	1 U
m,p-Xylene	179601-23-1	4 U	4 U	4 U	2 U	2 U	2 U	2 U
Methyl Tert-Butyl Ether	1634-04-4	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Methylene Chloride	75-09-2	10 U	10 U	10 U	5 U	5 U	5 U	5 U
Naphthalene	91-20-3	4 U	4 U	4 U	2 U	2 U	2 U	2 U
n-Butylbenzene	104-51-8	2 U	2 U	2 U	1 U	1 U	1 U	1 U
n-Propylbenzene	103-65-1	2 U	2 U	2 U	1 U	1 U	1 U	1 U
o-Xylene	95-47-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Styrene	100-42-5	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Tert-butyl ethyl ether	637-92-3	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	127-18-4	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Tetrahydrofuran	109-99-9	4 U	4 U	4 U	2 U	2 U	2 U	2 U
Toluene	108-88-3	2 U	2 U	2 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	156-60-5	2 U	2 U	2 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	0.8 U	0.8 U	0.8 U	0.4 U	0.4 U	0.4 U	0.4 U
Trichloroethene	79-01-6	2 U	2 U	2 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	75-69-4	4 U	4 U	4 U	2 U	2 U	2 U	2 U
Vinyl Chloride	75-01-4	4 UL	4 UL	4 UL	2 UL	2 UL	2 UL	2 UL

APPENDIX E

APPENDIX E

6XP P DU\ RI ([WUDFWHG: H0Analytical Results - DQXDU\
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Date:	4-Jan-11					
Sample Location:	EWS4	EWS5	EWM1	EWM2	EWM3	EWG2
Station Location:	EWS4-01042011	EWS5-01042011	EWM1-01042011	EWM2-01042011	EWM3-01042011	EWG2-01042011
Parameter	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Volatile Organic Compounds						
Organic Sample No.:	A2NT4	A2NT5	A2NT1	A2NT2	A2NT3	A2NT0
Vinyl Chloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	0.66 J
Acetone	1.8 JB	2.2 JB	10 U	1.9 JB	10 U	2.2 J
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethene (total)	1.8 J	4.8 J	1.4 J	2.4 J	9.8	0.86 J
1,1-Dichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	15	31	4.4 J	2.0 J	6.3	0.66 J
Toluene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Tetrachloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Metals						
Inorganic Sample No.:	MA2NT4	MA2NT5	MA2NT1	MA2NT2	MA2NT3	MA2NT0
Silver	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	10 U	9.8 J	4.1 J	10 U	26
Barium	17.9 JE	16.1 JE	24.9 JE	11.6 JE	17.8 JE	21.3 JE
Beryllium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	5.0 U	5.0 U	5.0 U	0.19 J	5.0 U	5.0 U
Chromium (total)	10 U	13	10 U	10 U	10 U	10 U
Iron	1020	2810	5900	7010	100 U	16000
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Manganese	23.4 E	9.5 JE	1240 E	758 E	7.4 JE	772 E
Nickel	2.7 J	2.7 J	8.9 J	8.9 J	1.1 J	13.1 J
Lead	10 U	36	10 U	1.4 J	10 U	1.2 J
Antimony	60 U	60 U	60 U	60 U	60 U	60 U
Selenium	35 U	35 U	35 U	35 U	35 U	35 U
Vanadium	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	7.90 J	36.6 J	15.5 J	37.7 J	2.70 J	44.2 J

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6XPPDU RI([WUDFWDEOH:DWHU &RQWDPLQDQWV &RQFHQWUDWLRQV
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Date:	**5-Apr-11**					
Sample Location:	**EWS4**	**EWS5**	**EWM1**	**EWM2**	**EWM3**	**EWG2**
Station Location:	**EWS4-04052011**	**EWS5-04052011**	**EWM1-04052011**	**EWM2-04052011**	**EWM3-04052011**	**EWG2-04052011**
Parameter	**(µg/L)**	**(µg/L)**	**(µg/L)**	**(µg/L)**	**(µg/L)**	**(µg/L)**
Volatile Organic Compounds						
Organic Sample No.:	A43W5	A43W6	A43W2	A43W3	A43W4	A43W1
Vinyl Chloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	7.8 JB	9.1 JB	7.1 JB	11 B	7.3 JB	8.0 JB
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	1.5 JB	1.5 JB	1.5 JB	1.3 JB	1.5 JB	1.5 JB
1,2-Dichloroethene (total)	2.2 J	0.70 J	1.2 J	0.7 J	7.2	5.0 U
1,1-Dichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	19	9.7	3.3 J	5.0 U	5.0 J	5.0 U
Toluene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Tetrachloride	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Metals						
Inorganic Sample No.:	MA43W5	MA43W6	MA43W2	MA43W3	MA43W4	MA43W1
Silver	10 U	10 U	10 U	10 U	10 U	10 U
Arsenic	10 U	1.9 J	9.6 J	10 U	10 U	23
Barium	17.2 J	27.6 J	26.2 J	13.4 J	19.3 J	30.8 J
Beryllium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.00 U	5.0 U	5.0 U
Chromium (total)	10 U	24	10 U	10 U	10 U	10 U
Iron	20.3 J	4950	6300	2410	100 U	16300
Mercury	0.040 J	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Manganese	2.3 J	16	1310	1460	6.9 J	798
Nickel	4.1 J	2.9 J	6.8 J	12.6 J	1.1 J	5.6 J
Lead	2.1 J	61	10 U	10 U	10 U	10 U
Antimony	60 U	60 U	60 U	60 U	60 U	60 U
Selenium	35 U	35 U	35 U	35 U	35 U	35 U
Vanadium	50 U	50 U	50 U	50 U	50 U	50 U
Zinc	12.6 J	79.9	3.20 J	14.8 J	17.4 J	15.1 J

APPENDIX E

Summary of Extraction Well Analytical Results - EW-S1
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW- S1		
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011	10/21/2011 DUP
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature					
pH					
Volatile Organic Compounds					
Organic Sample No.:			200-5703-7	200-7597-7	200-7597-8FD
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	7.0 JB	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U	5.0 U
Trichloroethene	Not Listed	434	5 JB	5.2 B	5.2 B
Toluene	Not Listed	2,500	0.12 JB	5.0 U	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U	5.0 U
Metals					
Inorganice Sample No.:			200-5703-7	200-7597-7	200-7597-8FD
Silver	0.9	Not Listed	10.0 U	10.0 U	10.0 U
Arsenic	Not Listed	0.75	70.1	15.3	11.8
Barium	Not Listed	5,400	53.4 J	43.1 J	37.9 J
Beryllium	Not Listed	10	5.0 U	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	0.53 J	5.0 U
Chromium (total	41	27	25.0	6.6 J	3.4 J
Iron	Not Listed	Not Listed	5950.0	7510	3390
Mercury	Not Listed	0.273	0.20 U	0.2 U	0.2 U
Manganese	Not Listed	Not Listed	479.0	627 D	520 D
Nickel	355	39	11.9 J	13.1 J	6.4 J
Lead	34	1.3	15.7	28.3	14.4
Antimony	Not Listed	23,000	60.0 U	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35 U	35 U
Vanadium	Not Listed	Not Listed	17.9 J	5.6 J	4.5 J
Zinc	Not Listed	Not Listed	40.3 J	95.2	52.3 J

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-S2
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-S2	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-9	200-7597-9
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	5.2 JB	4.7 J
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	2.1 JB	10.0 U
Toluene	Not Listed	2,500	0.088 JB	0.120 J
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-9	200-7597-9
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	16.1	12.6
Barium	Not Listed	5,400	48.3 J	48.9 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	0.41 J
Chromium (total	41	27	43.8	17.9
Iron	Not Listed	Not Listed	26900.0	13000.0
Mercury	Not Listed	0.273	0.20 U	0.20 U
Manganese	Not Listed	Not Listed	1280 D	2840 D
Nickel	355	39	11.8 J	7.4 J
Lead	34	1.3	4.8 J	2.9 J
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	3.6 J	3.1 J
Zinc	Not Listed	Not Listed	49.2 J	58.1 J

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-S3
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-S3	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-8	200-7597-10
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	19 B	6.3 B
Toluene	Not Listed	2,500	0.11 JB	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-8	200-7597-10
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	107.0	39.2
Barium	Not Listed	5,400	54.1 J	42.8 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	1.3 J
Chromium (total	41	27	13.4	32.5
Iron	Not Listed	Not Listed	14200.0	12300
Mercury	Not Listed	0.273	0.20 U	0.092 J
Manganese	Not Listed	Not Listed	1130 D	943 D
Nickel	355	39	4.2 J	20.1 J
Lead	34	1.3	5.0 U	74.4
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	10.3 J	22.0 J
Zinc	Not Listed	Not Listed	34.2 J	111

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-S4
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-S4	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-2	200-7597-11
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	18 B	15.0 B
Toluene	Not Listed	2,500	0.067 JB	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	0.12 J	5.0 U
Metals				
Inorganice Sample No.:			200-5703-2	200-7597-11
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	10.0 U	10.0 U
Barium	Not Listed	5,400	14.9 J	11.1 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	5.0 U
Chromium (total	41	27	10.0 U	10.0 U
Iron	Not Listed	Not Listed	41.7 J	130
Mercury	Not Listed	0.273	0.20 U	0.20 U
Manganese	Not Listed	Not Listed	3.1 J	102
Nickel	355	39	1.9 J	4.3 J
Lead	34	1.3	10.0 U	14.5
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	50.0 U	0.80 J
Zinc	Not Listed	Not Listed	3.3 J	60.0 U

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-S5
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-S5	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-1	200-7597-12
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	5.7 B	4.2 JB
Toluene	Not Listed	2,500	0.097 JB	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-1	200-7597-12
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	10.0 U	10.0 U
Barium	Not Listed	5,400	16.1 J	8.6 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	5.0 U
Chromium (total	41	27	10.0 U	10.0 U
Iron	Not Listed	Not Listed	231.0	388
Mercury	Not Listed	0.273	0.20 U	0.20 U
Manganese	Not Listed	Not Listed	5.0 J	5.2 J
Nickel	355	39	31.0 J	15.7 J
Lead	34	1.3	4.9 J	10.0 U
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	50.0 U	0.65 J
Zinc	Not Listed	Not Listed	57.5 J	33.9 J

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-M1
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-M1	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-3	200-7597-13
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	2.8 JB	1.6 JB
Toluene	Not Listed	2,500	0.055 JB	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-3	200-7597-13
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	18.6	9.6 J
Barium	Not Listed	5,400	24.2 J	17.2 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	5.0 U
Chromium (total	41	27	10.0 U	10.0 U
Iron	Not Listed	Not Listed	7810.0	4660
Mercury	Not Listed	0.273	0.20 U	0.13 J
Manganese	Not Listed	Not Listed	1150 D	899 D
Nickel	355	39	5.5 J	5.8 J
Lead	34	1.3	10.0 U	10.0 U
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	50.0 U	0.68 J
Zinc	Not Listed	Not Listed	2.7 J	60.0 U

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-G1
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-G1	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-5	200-7597-15
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	0.35 JB	5.0 U
Toluene	Not Listed	2,500	0.12 JB	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-5	200-7597-15
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	4.3 J	35.4
Barium	Not Listed	5,400	200 U	24.8 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	5.0 U
Chromium (total	41	27	10.0 U	10.0 U
Iron	Not Listed	Not Listed	8760.0	27400
Mercury	Not Listed	0.273	0.20 U	0.20 U
Manganese	Not Listed	Not Listed	1440 D	1510 D
Nickel	355	39	9.0 J	1.8 J
Lead	34	1.3	2.5 J	2.7 J
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	50.0 U	0.93 J
Zinc	Not Listed	Not Listed	13.8 J	34.5 J

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-M3
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-M3	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-6	200-7597-14
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	4.9 JB	4.2 JB
Toluene	Not Listed	2,500	5.0 U	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-6	200-7597-14
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	10.0 U	10.0 U
Barium	Not Listed	5,400	19.3 J	13.5 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	5.0 U
Chromium (total	41	27	10.0 U	10.0 U
Iron	Not Listed	Not Listed	65.7 J	248
Mercury	Not Listed	0.273	0.20 U	0.20 U
Manganese	Not Listed	Not Listed	8.1 J	33.8
Nickel	355	39	1.6 J	1.6 J
Lead	34	1.3	10.0 U	3.4 J
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	50.0 U	1.1 J
Zinc	Not Listed	Not Listed	16.9 J	24.6 J

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.

APPENDIX E

Summary of Extraction Well Analytical Results - EW-G2
Groundwater Extraction and Treatment System
Groveland Wells Superfund Site

Sample Location:	Effluent Discharge Limits		EW-G2	
Sample Date:	Daily Maximum	Average Monthly	6/29/2011	10/21/2011
Parameter	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Temperature				
pH				
Volatile Organic Compounds				
Organic Sample No.:			200-5703-4	200-7597-16
Vinyl Chloride	Not Listed	2,816	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	17.2	5.0 U	5.0 U
Acetone	Not Listed	Not Listed	10.0 U	10.0 U
2-Butanone	Not Listed	Not Listed	10.0 U	10.0 U
Methylene Chloride	Not Listed	8,600	5.0 U	5.0 U
1,2-Dichloroethene (total)	Not Listed	172	5.0 U	5.0 U
1,1-Dichloroethene	Not Listed	Not Listed	5.0 U	5.0 U
1,1,1-Trichloroethane	Not Listed	500	5.0 U	5.0 U
Benzene	Not Listed	381	5.0 U	5.0 U
Trichloroethene	Not Listed	434	0.72 JB	5.0 U
Toluene	Not Listed	2,500	0.31 JB	5.0 U
Carbon Tetrachloride	Not Listed	Not Listed	5.0 U	5.0 U
1,1,2-Trichloroethane	Not Listed	Not Listed	5.0 U	5.0 U
Tetrachloroethene	Not Listed	47.7	5.0 U	5.0 U
Chlorobenzene	Not Listed	112,600	5.0 U	5.0 U
Metals				
Inorganice Sample No.:			200-5703-4	200-7597-16
Silver	0.9	Not Listed	10.0 U	10.0 U
Arsenic	Not Listed	0.75	32.3	10.0 U
Barium	Not Listed	5,400	28.8 J	5.6 J
Beryllium	Not Listed	10	5.0 U	5.0 U
Cadmium	2.3	2.0	5.0 U	5.0 U
Chromium (total	41	27	10.0 U	10.0 U
Iron	Not Listed	Not Listed	27700.0	5280
Mercury	Not Listed	0.273	0.20 U	0.20 U
Manganese	Not Listed	Not Listed	1230 D	615 D
Nickel	355	39	2.7 J	11.7 J
Lead	34	1.3	10.0 U	10.0 U
Antimony	Not Listed	23,000	60.0 U	60.0 U
Selenium	Not Listed	12	35.0 U	35.0 U
Vanadium	Not Listed	Not Listed	50.0 U	50.0 U
Zinc	Not Listed	Not Listed	37.1 J	15.4 J

Notes:
U = Analyte not detected. Reporting limit shown.
J = Estimated concentration below sample reporting limit.
ug/L = micrograms per liter.
B = Compound found in both bland and sample.
NA = Not Analyzed.